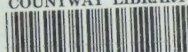
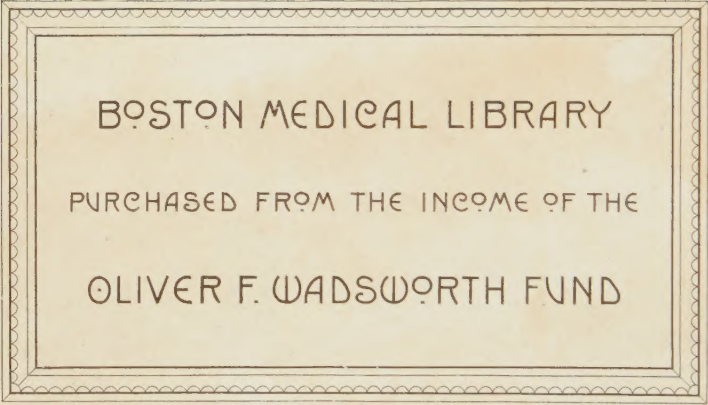


COUNTWAY LIBRARY




HC 5N7M 0



BOSTON MEDICAL LIBRARY

PURCHASED FROM THE INCOME OF THE

OLIVER F. WADSWORTH FUND



Digitized by the Internet Archive
in 2025

THE THEORY AND PRACTICE
OF MASSAGE

THE THEORY AND PRACTICE OF MASSAGE

BY

BEATRICE M GOODALL-COPESTAKE

EXAMINER TO THE INCORPORATED SOCIETY OF TRAINED MASSEUSES,
TEACHER OF MASSAGE AND SWEDISH REMEDIAL EXERCISES TO THE
NURSING STAFF OF THE LONDON HOSPITAL

SECOND EDITION

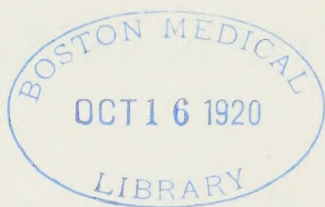
WITH 67 ILLUSTRATIONS



PAUL B. HOEBER

67 & 69 EAST 59TH STREET
NEW YORK

1919



22.8.178.

18365 Had 2.70

Printed in England.

IN
MEMORY OF A PHYSICIAN
A FAITHFUL SERVANT OF GOD
A DEVOTED STUDENT OF HIS WORKS
AN EXAMPLE TO HER AND COUNTLESS OTHERS
OF SYMPATHY PATIENCE
AND UNSELFISHNESS
THIS IS DEDICATED
BY A GRATEFUL DAUGHTER,

PREFACE TO THE SECOND EDITION

THE kind reception and more than kindly criticism bestowed upon this book at its first publication, together with a continued demand for it, affords an opportunity for revision, correction, and such addition as is possible in these difficult days. A few changes have appeared to be desirable in those pages which deal with the treatment of fractures, and those relating to the treatment of injured nerves have been slightly developed. A chapter has been added which deals in outline with the after-treatment of war injuries by massage and movements. The illustrations of apparatus and their descriptions have been most kindly placed at my disposal by Mrs. Guthrie Smith, and it is hoped that the hints there given may be found of some assistance to those who are still devoting their services to the wounded.

To my kind critics and to those who have given me their valuable time and valued help, I am deeply indebted, especially to Miss E. M. Magill, M.B., B.Sc., and Miss A. M. Ryde. For the photographs showing the fracture of the olecranon process I have to thank Miss Grace Edwards, and also the Incorporated Society of Trained Masseuses for the loan of a diagram published in their journal.

The publication of a second edition gives me the opportunity of acknowledging helpful suggestions received from Miss A. W. Brown and Miss E. M. Humble in preparing the first edition, but whose names were inadvertently omitted from the preface to that edition.

B. M. G.-C.

January 1919.

PREFACE TO THE FIRST EDITION

THE increasing number of students who are qualifying themselves for a professional career in the important branch of work of which this book treats, and the author's experience of their needs, have encouraged her to attempt to place before them in a concise form a résumé of the different branches of the science and practice of massage, access to which she has found difficult to obtain without consulting a mass of volumes not readily within reach.

That the work before them is important and of a national character needs no emphasis at this date; for the basis of it is to restore to usefulness and new opportunities of service men, women, and children who are disabled in varying degrees and from various causes.

Never has the need for their patient study and skill been so great as at the present time, and these pages are published in the earnest hope that they may be helpful to those who are qualifying themselves to take their part in this work.

Theoretical instruction is necessary: but the practical application of their art can only be acquired by perseverance and patience under a good teacher. The manipulations and exercises described are based on Ling's Swedish System; the further details of the application of massage in connection with various diseases and deformities have been added in the hope that they will guide students to an intelligent grasp of their special work.

I gladly avail myself of this opportunity to thank Miss E. M. Magill, M.B., B.Sc., for many useful suggestions and for reading the proofs; Mr. A. R. F. Evershed, M.R.C.S., for the photographs of massage manipulations which he has

A little knowledge is a dangerous thing—not if you know how little it is.—*Sir William Gull.*

CONTENTS

PART I

CHAPTER I

THE HISTORY OF MASSAGE.—Derivation of the word—Massage among the early Chinese—Greeks and Romans—The Emperor Hadrian—Writings of Hippocrates—Massage in the Middle Ages—Peter Henry Ling—Massage in England—Founding of the Incorporated Society of Trained Masseuses—Its motto—Its aims—Its rules
pp. 1-4

CHAPTER II

HINTS TO BEGINNERS.—Personality—The choice of training school—Etiquette of the massage profession—The care of the patient—The use of powder and lubricants—Status of masseuse after training pp. 5-9

CHAPTER III

MASSAGE MANIPULATIONS.—Definition of Massage—Classification of movements—Effleurage and stroking—Petrissage—Frictions—Tapotement—Vibrations—Shakings pp. 10-16

CHAPTER IV

THE PHYSIOLOGICAL EFFECTS OF MASSAGE.—Influence upon the skin—Upon the muscles—Upon the circulation—Upon the flow of lymph and the process of absorption—Upon the nervous system—Metabolism—Influence of massage upon metabolism, pp. 17-23

CHAPTER V

PRACTICAL MASSAGE.—Hints for learning massage—Arm—Wrist and hand—Elbow—Shoulder—Thigh—Hip—Back of the thigh—Knee—Lower leg—Foot and ankle—Back—Neck—Front of the neck and throat—Chest—Abdomen—Stomach—Liver—Small intestine—Colon—Details of Manipulations—Effects of abdominal massage—Contra-indications to abdominal massage—General massage—Face massage—Head massage—Local heart treatment—General contra-indications to massage pp. 24-42

CHAPTER VI

THE PASSIVE AND ACTIVE MOVEMENTS USED WITH MASSAGE.—Passive movements, Effects and uses—Active movements—Muscle work, concentric, eccentric, static—Uses of various kinds of muscle work—The ranges of working muscles—Effects and uses of active movements—Practical hints on giving movements—Movements in the upper extremity: fingers, thumb, wrist, elbow, shoulder—Movements in the lower extremity: foot, ankle, knee, hip—Head and neck movements pp. 43-55

CHAPTER VII

RESPIRATION.—The respiratory forces—The uses of breathing exercises—How to teach deep breathing—Positions—Breathing exercises pp. 56-60

CHAPTER VIII

SOME GENERAL EXERCISES.—Rules for giving exercises—Order of giving exercises—Positions—Arm exercises—Leg exercises—Trunk exercises—Sacral beating—Chest clapping . pp. 61-77

PART II

*SURGICAL CONDITIONS TREATED BY MASSAGE,
WITH DETAILS OF APPLICATION*

CHAPTER IX

INFLAMMATION.—Causes—The natural process of repair—The process of inflammation—The terminations—Suppuration—THE HEALING OF WOUNDS—By first intention—By second intention or granulation—Tubercular inflammation of bone—Tuberculous disease of the spine pp. 78-84

CHAPTER X

FRACTURES.—Varieties of fractures—Epiphyses and diaphyses of bones—Traumatic separation of an epiphysis—The union of fractures—Ununited fractures—The signs of fracture—Early treatment—The treatment of fractures by massage—Passive movements—Hints on massage and movements in or near fractures—In the later stages—*Treatment of special fractures*—The clavicle—The anatomical neck of the humerus—The surgical neck of the humerus—The shaft of the humerus—The olecranon process—Wiring of the olecranon—Other fractures in or near elbow-joint—Colles's fracture—The bones of the forearm—The neck of the femur—The shaft of the femur—The patella—Pott's fracture—The tibia and fibula—The bones of the foot pp. 85-104

CONTENTS

xv

CHAPTER XI

DISLOCATIONS.—Traumatic dislocations—Signs of dislocations—Treatment—Shoulder—Elbow—Hip—Knee and ankle—Congenital dislocations—Sprains—Sprain and rupture of muscles and their tendons—Synovitis—Acute—Chronic—Teno-synovitis—Bursitis—Knee-joint—Displacement of a semilunar cartilage—Other injuries to the knee-joint—Stiff joints—Volkman's ischæmic paralysis pp. 105-119

CHAPTER XII

DEFORMITIES.—Torticollis or wry-neck—Cervical rib—Curvature of the spine—Scoliosis—Kyphosis—Lordosis—Deformities of the upper extremity—Sprengel's shoulder—Congenital contraction of the fingers—Dupuytren's contraction—Deformities of the lower extremity—Coxa vara—Knock knees or Genu valgum—Bow legs or Genu varum—The foot—Flat foot—Talipes or club foot pp. 120-144

PART III

MEDICAL CONDITIONS TREATED BY MASSAGE, WITH DETAILS OF APPLICATION

CHAPTER XIII

Constipation—Dyspepsia or indigestion—Gastritis—Acute—Sub-acute—Chronic—Dilatation of the stomach—Gastric ulcer—Enteritis—Colitis—Appendicitis—Visceroptosis or Glénard's disease—Gastroptosis—Movable or floating kidney—Hæmorrhoids or Piles pp. 145-156

CHAPTER XIV

Acute rheumatism or rheumatic fever—Chronic rheumatism of joints—Muscular rheumatism—Fibrosis—Pleurodynia—Lumbago—Rheumatism of the head—Rheumatoid arthritis—Myopathy—Gout—Polyuria or Diabetes insipidus—Diabetes mellitus—Rickets—Obesity—Respiratory diseases—Chronic bronchitis—Adenoids pp. 157-171

CHAPTER XV

DISEASES OF THE CIRCULATORY SYSTEM.—Blood pressure—Heart disease—Treatment by massage—Nauheim treatment—Anæmia—Chlorosis—Phlebitis—Thrombosis—Embolism—Varicose veins—Phlegmasia alba dolens or White leg—Edema . pp. 172-185

CHAPTER XVI

NERVES AND NERVOUS DISEASES.—The Nervous System.—The structure of nerves—Nerve degeneration—Upper and lower motor neurones—Reflex action—Classification of types of paralysis—Paralysis—AFFECTIONS OF THE UPPER MOTOR NEURONES—Hemiplegia—Recovery of muscle groups—Order of massage for old-standing hemiplegia—The re-education of movement—Infantile hemiplegia—Paraplegia—Cerebral diplegia—Multiple or disseminated sclerosis—AFFECTIONS OF THE LOWER MOTOR NEURONES—Progressive muscular atrophy—Anterior polio-myelitis or infantile paralysis pp. 186-198

CHAPTER XVII

AFFECTIONS OF LOWER MOTOR NEURONES *continued*.—INJURIES OF NERVE TRUNKS.—*Of the upper extremity*—Injuries to the brachial plexus—Erb's paralysis—Crutch paralysis—Drunkard's paralysis—Injury to the circumflex nerve—Injury to the median nerve—Injury to the ulnar nerve—Injury to the musculo-spiral nerve—Positions of rest and massage for injuries to the brachial plexus—circumflex, median, ulnar, and musculo-spiral nerves—*Injuries to nerves of the lower extremity*—The anterior crural nerve—The obturator nerve—The external popliteal nerve . . pp. 199-207

CHAPTER XVIII

AFFECTIONS OF LOWER MOTOR NEURONES *continued*.—DISEASES OF NERVE TRUNKS.—Neuritis and neuralgia—Cervico-brachial neuritis or neuralgia—Sciatica—Coccydynia—Metatarsalgia—Intercostal neuralgia—Tri-geminal neuralgia or neuritis or tic douloureux—Facial paralysis or Bell's palsy—Post diphtheritic paralysis pp. 208-215

CHAPTER XIX

AFFECTIONS OF THE SENSORY TRACTS—Locomotor ataxy—AFFECTIONS OF BOTH MOTOR AND SENSORY TRACTS—Chronic transverse myelitis—Friedreich's ataxia pp. 216-218

CHAPTER XX

NERVOUS DISEASES *continued*.—Temperament—The nervous temperament—Functional nervous diseases—Neurasthenia—Hysteria—Neuroses—The neurosis of occupation—Writer's cramp—Paralysis agitans—Chorea or St. Vitus's dance . . pp. 219-228

CHAPTER XXI

Headache—Fatigue and sleep—Insomnia—Weir-Mitchell treatment—
Relaxation—Suggestion pp. 229-236

CHAPTER XXII

Massage during pregnancy—After confinement—Massage of the
breasts—Exercises after confinement pp. 237-240

CHAPTER XXIII

THE AFTER-TREATMENT OF WAR INJURIES BY MASSAGE AND MOVE-
MENTS.—Physico-therapeutics in military hospitals and con-
valescent camps—Nerve Injuries—Stiff joints—Mechanical ap-
pliances—Apparatus to exercise wrist joints—Apparatus for Flat
Foot—Apparatus to exercise a stiff ankle—Apparatus to exercise
elbow joints—Apparatus for passively stretching the arm—
Apparatus for abduction of the shoulder—Apparatus for improving
reach of arm—Apparatus to overcome contracted hamstrings—
Apparatus for strengthening the hand-grip—Massage treatment
for shell-shock—Trench foot pp. 241-252

APPENDIX—Specimen questions from recent examinations (In-
corporated Society of Trained Masseuses) pp. 253, 254

GLOSSARY pp. 255, 256

BIBLIOGRAPHY p. 257

INDEX pp. 259-265

LIST OF ILLUSTRATIONS

FIG.	PAGE
1. EFFLEURAGE	10
2. PETRISSAGE	10
3. WRINGING	13
4. FRICTION	13
5. HACKING	14
6. POUNDING	14
7. BEATING: FIRST POSITION OF HAND	16
8. BEATING: SECOND POSITION OF HAND	16
9. EFFLEURAGE OF ARM: MIDDLE OF STROKE	24
10. EFFLEURAGE OF ARM: END OF STROKE	24
11. PETRISSAGE OF ARM	26
12. KNEADING THE THIGH	28
13. PETRISSAGE OF RECTUS FEMORIS	28
14. KNEADING THE BACK	30
15. FRICTIONS DOWN THE SPINE	30
16. PICKING UP OF TRAPEZIUS	32
17. TRANSVERSE KNEADING OF ABDOMEN	34
18. COLON FRICTIONS	34
19. DIAGRAM OF MUSCLE RANGES	45
20. HOLDING FOR PRONATION AND SUPINATION	49
21. DIAGRAM OF CHANGES DUE TO INFLAMMATION	79
22. ANGULAR CURVATURE	83
23. DIAGRAM OF UNION OF A SIMPLE FRACTURE	88
23a. FRACTURE OF THE OLECRANON PROCESS	96

FIG.	PAGE
23 <i>b</i> . FRACTURED OLECRANON AFTER WIRING	96
24. RIGHT COLLES'S FRACTURE: POSTERO-ANTERIOR VIEW	97
25. RIGHT COLLES'S FRACTURE: LATERAL VIEW	97
26. COLLES'S FRACTURE: LATERAL VIEW	97
27. COLLES'S FRACTURE: PALMAR VIEW	97
28. CARR'S SPLINT	98
29. FRACTURE OF THE NECK OF THE FEMUR	99
30. FRACTURE OF THE PATELLA	101
31. POTT'S FRACTURE: POSTERO-ANTERIOR VIEW . . .	102
32. POTT'S FRACTURE: LATERAL VIEW	102
33. SUB-GLENOID DISLOCATION OF SHOULDER	107
34. SUB-SPINOUS DISLOCATION OF SHOULDER	107
35. SUB-CORACOID DISLOCATION OF SHOULDER	107
36. DISPLACEMENT OF EXTERNAL SEMILUNAR CARTILAGE .	116
37. CONGENITAL TORTICOLLIS BEFORE SURGICAL TREATMENT	120
38. CONGENITAL TORTICOLLIS AFTER SURGICAL TREATMENT	120
39. NORMAL SPINE	123
40. SCOLIOSIS: POSTERIOR VIEW	125
41. SCOLIOSIS: ANTERIOR VIEW	125
42. DIAGRAM SHOWING SCOLIOSIS	126
43. RIGHT DORSAL SCOLIOSIS	127
43 <i>a</i> . SKIAGRAM OF SCOLIOSIS, SHOWING ROTATION . . .	128
44. SCOLIOSIS	129
45. KYPHOSIS	131
46. LORDOSIS	132
47. DUPUYTREN'S CONTRACTURE	134
48. FLAT FOOT	139
48 <i>a</i> . FOOTPRINT OF AN AVERAGE FOOT	140
49. FOOTPRINT OF AVERAGE FLAT FOOT	140
50. FOOTPRINT OF EXTREME FLAT FOOT	140
51. PARALYTIC TALIPES EQUINUS	142
52. CONGENITAL TALIPES EQUINO-VARUS	142
53. CLAW-HAND FROM ULNAR PARALYSIS	201

LIST OF ILLUSTRATIONS

xxi

FIG.	PAGE
54. WRIST-DROP	202
55. METHOD OF EFFECTING REST IN MEDIAN NERVE PARALYSIS	204
56. POSITION FOR IMMEDIATE REST IN MUSCULO-SPIRAL PARALYSIS	205
57. STRETCHING THE SCIATIC NERVE	210
58. KNUCKLE-FRICTIONS OF THE SCIATIC NERVE	210
59. APPARATUS TO EXERCISE WRIST-JOINTS, FOR FLAT FOOT, AND TO EXERCISE THE ANKLE-JOINT	244
60. APPARATUS TO EXERCISE SHOULDER-JOINTS, ELBOW- JOINTS, AND TO IMPROVE REACH	246
61. APPARATUS FOR INJURIES TO THE ARM	247
62. APPARATUS TO OVERCOME CONTRACTED HAMSTRINGS	248
63. APPARATUS FOR STRENGTHENING THE HAND-GRIP	249

OCT 16 1920

LIBRARY

MASSAGE

PART I

CHAPTER I

THE HISTORY OF MASSAGE :—Derivation of the word—Massage among the ancient Chinese, Greeks, and Romans—The Emperor Hadrian—The writings of Hippocrates—Massage in the Middle Ages—Peter Henry Ling—Massage in England—Founding of the Incorporated Society of Trained Masseuses—Its motto—Its aims—Its rules.

THE science and practice of Massage has only become a popular therapeutic agent in comparatively recent times, and is now in common use in almost every country. In a primitive form, however, it is very old, as old as civilisation itself.

The word "massage" is probably derived from the Arabic *mass* or *mas'h*—"to press softly"; but in its present form we have it from the French *masser*—"to shampoo."

Three thousand years before the Christian era, the Chinese had a system of gymnastics and massage, records of which are found in the ancient writings of Kong Fu, and it is also mentioned in the sacred books of the Hindus. Among the ancient Greeks and Romans, massage was in an advanced stage of development. Homer about the year 1000 B.C. tells us in the *Odyssey* that beautiful women rubbed and anointed war-worn heroes to rest and refresh them. There is a well-known story of the Emperor Hadrian who died A.D. 138. "One day seeing an old soldier rubbing himself against the marble at the public baths, he stopped him and inquired why he did so. The veteran answered, 'Because I have no slave to rub me,' whereupon the Emperor pitying his condition gave him two slaves and enough to keep them.

On the following day, when the Emperor made his appearance, a number of old men began rubbing themselves against the wall, hoping to have similar good fortune, but the Emperor, divining their intention, directed them to rub one another."

The writings of Hippocrates (380 B.C.) may well be followed at the present day. He said: "A physician must be experienced in many things, but assuredly also in rubbing, for things that have the same name have not always the same effect. For rubbing can bind a joint that is too loose, and loosen a joint which is too tight. Rubbing can bind and loosen; can make flesh, and cause parts to waste. Hard rubbing binds, soft rubbing loosens; much rubbing causes parts to waste, moderate rubbing makes them grow." In his writings Hippocrates uses the term "Anatripsis," which means the art of rubbing up and not down. In those days the circulation of the blood was not understood, but Hippocrates must have made careful and persistent observations to discover that rubbing upwards in the case of limbs had a more favourable effect than rubbing down, and we may conclude he produced the same effects we are achieving to-day, with regard to the absorption of effusion, the relief of blood stasis, and the carrying away of morbid products in the system.

It may be interesting here to recall that the ancients supposed the arteries to be filled with air, hence their name. Galen, who lived 500 years after the time of Hippocrates, discovered that the arteries contained blood, but Harvey won the honour of first describing the circulation of the blood in the year A.D. 1628.

Towards the Middle Ages, massage seems to have fallen into disuse, at all events in Europe, but we hear of it again being used about the year 1580 by the great Ambroise Paré, the renowned French surgeon of the sixteenth century. In the year 1812 the whole system was revived and rearranged by Peter Henry Ling, a Swede. He established a school in Stockholm, which continues to the present day as the Central Gymnastic Institute. The Ling system comprises the use of gymnastics as well as massage, and is adapted for the use of those in health as well as the sick.

Within the last twenty-five years massage has gradually been adopted as a therapeutic agent in England. Before that time it was used, but those who practised it were people holding a somewhat anomalous position. There were few opportunities for training, and doctors had difficulty in finding competent workers to whom they might entrust their cases.

In the year 1894 a body of women joined in forming a Society of Trained Masseuses with the objects of safeguarding the interests of the profession, and of furthering the science, study, and practice of massage. In 1900 the Society was incorporated by permission of the Board of Trade, and became known from that date as the "Incorporated Society of Trained Masseuses." Through its efforts massage now ranks as an honourable profession for women in this country, and members can wear with pride the badge and motto "Digna Sequens"—"Following that which is worthy."

The aims of the Society are :—

1. To improve the status and training of Masseuses.
2. To provide for the examination of and the granting of certificates to masseuses.
3. To keep a roll of members.
4. To establish a Registry for members, and a centre of information for the public, on matters connected with massage.
5. To arrange lectures, to provide a reference library, and to afford opportunity for the discussion of subjects of interest and importance to masseuses.
6. To provide an organisation to which members have a right to apply for advice and help in professional difficulties, and in all things to promote efficiency in work, and the comfort and welfare of trained masseuses.

The Rules of the Society are :—

1. Not to undertake any cases of massage except under the direction of a registered medical practitioner, and in regard to massage for men to act in accordance with the by-laws of the Society.
 2. Not to advertise in any way whatever, except in recognised medical papers.
 3. Not to sell goods to patients in a professional capacity.
- The by-law referred to in rule 1 requires that—"No member or

certificate holder shall undertake massage for men, except at the request of a registered medical practitioner in an urgent or nursing case."

"Urgent cases include cases of local disease or injury where massage is ordered, and nursing cases are those of real illness, where massage is ordered as part of the treatment. General massage for men who are not really ill is not allowed to members of the Society."

The reasons for these rules are obvious, and only by adherence to them can certain dangers be avoided: so all candidates for examination undertake that they will keep them, and are required to sign a declaration to that effect.

Successful candidates at examinations do not become members until elected as such by the Society's Council. The Society publishes its own journal, containing articles of general interest to masseuses and all official notices of the Society. There is also a club-room and a valuable medical lending library for the use of members.

CHAPTER II

HINTS TO BEGINNERS :—Personality—The choice of training school—Etiquette of the massage profession—The care of the patient—The use of powder and lubricants—Status of masseuse after training.

PERSONALITY

ON the threshold of her career the would-be masseuse has some important points to decide. First, she must seriously consider whether she is fitted both physically and mentally for the arduous task she is about to set herself. Many people are entirely unsuited to this work, and if this be the case, time and money will be spent in vain, and bitter disappointment be the result of months spent in strenuous effort.

Good health and a certain degree of physical strength is a necessity to the masseuse. A broad, well-padded, warm, dry, and pliable hand is the ideal one for massage. The student should have received a fair all-round education, and will be greatly benefited by the possession of a good memory and the power to study methodically. These qualities are a great advantage, for there is a considerable amount of anatomy and other subjects to be digested in a comparatively short time.

THE CHOICE OF TRAINING SCHOOL

There are now many excellent institutions offering instruction to masseuses, but there are several important points upon which the would-be student should satisfy herself before beginning a course. Inquiry should be made as to the kind of massage taught, remembering that Swedish manipulations are becoming more and more universal. The class for practical instruction should be moderate in size. If too large, the teacher cannot give satisfactory attention to

all; if too small, the pupils do not have enough variety of practice. There should be opportunity for the treatment of patients under supervision, and instruction upon dissected anatomical specimens is a great advantage. Last but not least the student must inquire what certificates will be within her reach when her training is ended. Some schools grant their own certificates, and although such may prove proficiency, the student is urged to work for an independent examination—one which expects a high standard of work and grants a certificate well known to the medical profession and the public generally.

ETIQUETTE OF THE MESSAGE PROFESSION

Under this heading must be placed detail in the life of a masseuse, much of which can only be learnt by personal experience. If, however, the following hints and suggestions save the non-nurse masseuse from mistakes into which many of her predecessors have fallen, they will not have been written in vain.

In the present day, the massage student generally finds herself for all or part of her training within the walls of a hospital. During this time, then, she must conform to the unwritten laws of hospital etiquette, but good manners and common sense will in most cases bring her safely through. She must acknowledge the matron and sisters as her superior officers, remembering, whatever her position in the world, that for the time being she is subordinate to those holding office and responsibility in the institution where she works.

When privileged to treat a patient, she must carefully obey the orders given her, but do no more. If brought into contact with doctors, she addresses them as "Sir." She may ask for information as to the condition and treatment of the patient, but she must never offer her opinion unasked.

If entering a ward to treat a patient, the masseuse should report herself to the sister-in-charge. This is customary and important, as it affords opportunity for orders to be given, and any changes in the patient to be reported. She must do her work quietly and methodically, and when leaving see

that everything surrounding the patient is in the same order as she found it.

In private practice the masseuse will have first to make herself known to the doctors whom she hopes will employ her. This is best accomplished by introductions from other medical men.

When treating a private patient in a nursing home, the masseuse may receive orders directly from the doctor, or through the nurse in charge. In any case, changes noticed in the patient should be mentioned to the nurse, that she may report to the doctor at his next visit. When treating a patient in her own home the masseuse is often solely responsible to the doctor for her case.

THE CARE OF THE PATIENT

When summoned to a patient, the masseuse should give as little trouble as possible in the house, though necessary things must be asked for, and in all details consideration for the comfort and welfare of the patient is essential.

The masseuse should be punctual in her attendance, and leave as soon as her work is done. She must be scrupulously particular about her person, and washing the hands before and after treatment is a rule never to be broken.

Some people advocate the patient lying between blankets during treatment ; in any case she must be kept warm, and free from draught. A shawl should be at hand, and a hot-water bottle available. The masseuse should notice the temperature of the room, paying due attention to open windows and fire.

With regard to conversation during treatments, the masseuse must be tactful. Often the patient does not care to talk, and if she does it is best to let her begin the conversation. Any personal matters confided must be treated with strict professional secrecy. She must never mention another patient by name, and if called upon to discuss the doctor and his treatment, should be loyal to him, and say as little as possible.

The question of rest for the patient after treatment is a matter often to be decided by the masseuse, and she must to a

large extent be guided by the condition of the patient. Some suggest that the rest should be for the same length of time as the treatment ; but there is no hard-and-fast rule.

THE USE OF POWDER AND LUBRICANTS

It is allowable for the masseuse to use a small amount of powder on her hands when at work. It must be remembered, however, that the only merit of the powder is to make the hands glide comfortably, and if used in large quantities it fills the pores of the skin, which is undesirable. The powder should be soft, entirely free from lumps, and contain antiseptic properties. Highly scented powders should be avoided.

In the treatment of after-operation cases, fractures, and injuries a lubricant, *e.g.* olive or cocoa-nut oil, is more suitable. When the skin has been painted with iodine for an operation, it afterwards dries and peels off. This also happens when a part has been fixed by splints and bandages for a time ; the skin falls off in flakes. The dry skin is more easily removed by the use of oil, and the masseuse will be somewhat hampered in her work until this has taken place. Oils are also used for treating children, and those who are thin and emaciated. For these the lubricant may be used in larger quantities, with a view to nourishing and improving the tissues generally.

STATUS OF MASSEUSE AFTER TRAINING

A good masseuse will never forget that such qualities as tact, sympathy, and a confident manner without aggressiveness are essential to success. She must also bear in mind that when the actual time of her training is ended, she stands but at the threshold of her career, and still has very much to learn. Let her ever remember the high ideals of her profession. She has become equipped not only with a means of independence, but also of helping the sufferings of her fellow-creatures, and she is under a moral obligation to do the best in her power for each one who comes under her care. This should be her aim, whether the patient be the humblest hospital inmate or the highest in the land.

That great and sympathetic physician, Sir William Gull,

said : " If the first lesson be patience, the next lesson is docility, a readiness to learn at any source. . . . The difficulty, however, is in maintaining the docile spirit of which I speak, in preventing ourselves from assuming a knowledge we have not ; in not hastily coming to a conclusion without evidence ; and not resting content in our ignorance with a fool's satisfaction that no good would come of more knowledge if we had it."

CHAPTER III

MASSAGE MANIPULATIONS :—Definition of massage—Classification of movements—Effleurage and stroking—Petrissage—Frictions—Tapotement—Vibrations—Shakings.

Definition.—Massage may be described as a scientific way of treating some forms of disease, by external manipulations, applied in a variety of ways to the soft tissues of the body.

There are many varieties in the technique of massage, but the manipulation in general use may be classified as follows :—

Effleurage and stroking.
Petrissage, which includes kneading.
Frictions.
Tapotement—Hacking.
Clapping.
Beating.
Pounding.
Vibrations.
Shakings.

EFFLEURAGE

Effleurage (*effleurcr*, to skim over) (Fig. 1) is a stroking movement, done with the whole surface of one or both hands, or with the thumbs, in a centripetal direction, *i.e.* towards the heart. It is much used and may be given upon nearly every part of the body. When applied to the extremities, an even pressure must be maintained, and each stroke finished definitely where there are groups of lymphatic glands. Effleurage may be superficial or deep.

Effects and Uses.—1. Superficial effleurage has a soothing effect, and is much used for the relief of pain.

2. Deep effleurage helps the interchange of tissue fluids, by



FIG. 1. EFFLURAGE.

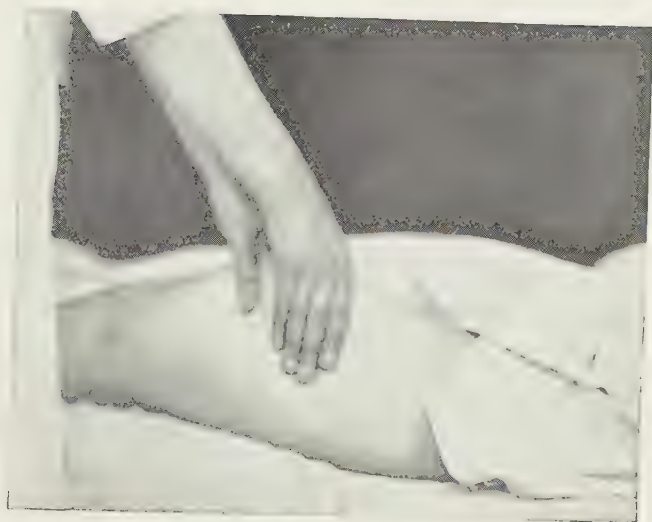


FIG. 2.—PETRISSAGE.

increasing the circulation in the superficial veins and lymphatics. The pressure helps the contents of the vessels towards the heart.

3. Applied strongly and quickly it has a stimulating effect.

4. It counteracts inflammation in its early stages, *e.g.* when given over a contusion.

5. It increases nutrition in all the tissues.

6. It removes fatigue, carrying away the increased products of combustion.

7. It assists the reabsorption of serous fluids.

Contra-indications.—In some conditions of neuritis and neuralgia light effleurage may be exceedingly painful and irritating. If this is the case it must be stopped at once. The masseuse is advised to try vibrations and firm muscle-kneading instead.

Scar tissue, *e.g.* a scar after an operation: until this is very well healed effleurage might reopen it. Large areas of skin injured by burns: in such cases friction is the only manipulation possible to use.

Stroking should here be mentioned, but must not be confused with effleurage, as it is performed in the opposite direction, and therefore does not influence the venous and lymphatic circulation. It may be done over large areas with the whole of one or both hands, and over smaller areas with the finger-tips or thumbs. It is given down the spine in long slow strokes, one hand following the other; on the extremities with both hands, and also down the course of nerves. These strokings are all of a soothing nature. The movement may be performed briskly, down the spine, on the extremities, and through the hair in head massage, when its effect is stimulating. Stroking is given over the stomach, liver, and intestines, but these manipulations will be further described with abdominal massage. In neuritis and neuralgia stroking as well as effleurage is sometimes irritating to the patient; when this is the case, it must be discontinued.

Very light circular manipulations with the finger-tips or thumbs are sometimes useful over tender and painful areas. Such manipulations are soothing, and they are given to relieve pain.

PETRISSAGE

Petrissage (*pétrir*, to knead) (Fig. 2) is a movement performed by grasping the tissues to be worked upon, with the whole hand, or with the thumb and fingers. Pressure must be given at right angles to the underlying bone, and the tissues lifted out from that bone. The hand is laid on the upper part of the limb, and gradually works to the joint below, at the same time each stroke must be in an upward direction. The movement is performed on definite muscle groups, *e.g.* on triceps beginning close to the axilla and gradually working to the elbow. The muscle must be lifted many times during the manipulation. The opposite hand supports the limb, thus enabling the groups worked upon to be thoroughly relaxed. In some cases it is necessary to use both hands, making a large grasp, *e.g.* Petrissage of Rectus Femoris.

Kneading, wringing, and picking up are all forms of petrissage.

Kneading (Fig. 12).—The tissues worked upon are pressed against the underlying parts with circular pressure, between one or both hands of the masseuse. When with both, the hands move alternately, and the pressure must always be in an upwards direction. This movement is much used upon the upper arm and thigh.

A circular kneading with the base of the hand is useful upon back muscles. The various abdominal kneadings are described with abdominal massage.

Wringing (Fig. 3).—The tissues are grasped in the same way as described in petrissage, but both hands are used, the muscles being alternately lifted from side to side. This movement is most suitable for treating the calf muscles and the forearm.

Picking Up.—The tissues are grasped with both hands, and are alternately moved backwards and forwards. This movement may be applied to many parts of the body, and is the form of petrissage most used in the treatment of obesity. The fat masses can be well grasped, but it is also used upon muscle tissue.



FIG. 3.—WRINGING.



FIG. 4.—FRICTION.

Effects and Use of Petrissage.—1. Petrissage is essentially the manipulation to influence muscles. It gives them a mechanical stimulation, causing them to contract.

2. It increases circulation specially in the veins by the alternate pressure and relaxation of the tissues.

3. It improves nutrition, as each pressure brings fresh blood to the part.

4. It raises the temperature locally.

5. It helps to break up and disperse inflammatory products.

6. It increases elimination of waste products.

7. It helps secretion and absorption.

8. It improves the condition of the nervous system.

9. It greatly influences the general metabolism of the body when given over large areas, *e.g.* back, abdomen, and extremities.

FRICTION (Fig. 4)

A small circular movement performed with the last phalanx of the thumb, with the tips of the three fingers, or with the knuckles. It is given with varying degrees of pressure upon the soft tissues, but is often performed against some hard surface, *e.g.* bone. Such friction is used upon joints, when its object is to influence the capsular and other ligaments. Friction is also given down the course of nerves, and upon the colon, but the manipulation is not then performed against a hard surface. It is often given in those regions where petrissage cannot be done. The knuckles are used when a specially deep manipulation is required, *e.g.* on the sole of the foot, over the gluteal muscles, and occasionally down the course of the sciatic nerve.

Effects and Use.—To a large extent, its uses are the same as those of petrissage, but friction is specially given—

1. To break down thickenings and adhesions. The movement is then done deeply.

2. To aid the reabsorption of inflammatory products.

3. To help general nutrition.

4. To help the absorption of fat in fatty tissues.

TAPOTEMENT

Tapotement (*tapoter*, to tap) is sometimes called percussion. There are several kinds, viz. hacking, clapping, beating, pounding.

Hacking (Fig. 5).—This movement needs much careful practice, and the pupil must adhere to certain rules when learning it. After these are mastered, everyone develops an individual way of doing the movement. Hacking is used upon almost every part of the body, but should be learnt by practice upon the back and shoulders of a fellow-student.

Preliminary Rules.—The arms are flexed at the elbows, and held abducted from the body. The wrists are dorsally flexed and the fingers extended and widely separated. The movement is one of pronation and supination, combined with ulnar flexion of the wrist. The tips of the fourth, third, and second fingers fall on the surface one after the other. The hands move alternately, but very evenly. Each stroke must be light and elastic. If the hacking is to be given very strongly, the ulnar border of the hand and fourth finger are allowed to fall more heavily on the surface.

Clapping.—This is given with the palmar surface of the hands. The wrist-joint must be very flexible. The hands are held somewhat cup-shaped, and fall alternately as in hacking.

Beating (Figs. 7, 8).—Performed with the fingers loosely flexed against the hand, and the wrist kept flexible. The whole hand falls somewhat heavily on the part treated. It may be done with one hand alone, or both together, the hands then moving alternately.

Pounding (Fig. 6).—This movement is one of combined hacking and beating. The fingers are flexed, the hand falls as in hacking, allowing the ulnar border of the hand and little finger to touch the surface. The manipulation is useful as a modification of beating.

Effects and Use of Tapotement.—Tapotement is a means of mechanically stimulating the tissues of the body.

1. When applied to muscles it causes them to contract.
2. When applied to nerves, hacking is the form of tapote-



FIG. 5.—HACKING.



FIG. 6.—POUNDING

ment most used, and it has the following effects: (a) When given lightly on the nerves for a short time it stimulates them, but if given heavily and for a long time it deadens them. (b) Hacking applied down each side of the spinal column stimulates the spinal nerves, and in a reflex way strengthens the heart. (c) It affects the vaso-motor nerves. If done lightly for a short time, it causes a local contraction. If done longer and harder, it results in a widening of the blood-vessels. (d) Hacking is said to influence secretory nerves, increasing their function.

3. Together with other manipulations, it is a means of raising the temperature of the body, and generally improving its metabolic conditions.

4. All tapotement when applied strongly is a means of loosening the products of inflammation.

5. Hacking is given over the region of the heart, but this is further described with its effects in heart treatment.

6. Clapping is the form of tapotement specially used to stimulate the skin. It increases the activity of the sweat glands.

7. Beating is used when a specially strong tapotement is necessary. It is most frequently applied to the sacral and gluteal regions.

8. Pounding is useful when beating is too strong, and it can be applied over smaller areas than beating.

VIBRATION

This is the most difficult massage manipulation to master. It is sometimes called a form of percussion, but it cannot be classified with tapotement.

Vibration is executed with the whole or part of the hand and fingers. There must be slight flexion at the elbow. A fine tremulous movement is made, but the hand remains more or less immobile during the movement, which should be performed from the wrist as much as possible. It may be given over almost any part of the body. The hand rests lightly on the part, and heavy pressure must always be avoided. Such vibration has a soothing effect and is used for relieving pain.

Running vibration is given down the course of the nerves, with the tips of the fingers. This is used in the treatment of neuritis of the arm and leg. Its effect is soothing.

In some forms of paralysis, similar manipulations are useful for stimulating the nerves. If a stronger stimulation is required, a stationary vibration pressure may be given on the nerve at various points down its course.

"Vibrations act reflexly upon the vaso-constrictor nerves, and if continued long enough (3-4 minutes) will inhibit their action, and make the blood-vessels relax" (*Timberg*).

Various mechanical appliances have been invented to produce vibration. These are much used to replace manual vibration. Every masseuse, however, should become proficient in performing manual vibration, for on many occasions it is preferable to that form produced mechanically.

SHAKING

Is a stimulating movement for use upon the abdominal organs. All forms are described in detail with abdominal massage.



FIG. 7.—BEATING. FIRST POSITION OF HAND.



FIG. 8.—BEATING. SECOND POSITION OF HAND.

CHAPTER IV

THE PHYSIOLOGICAL EFFECTS OF MASSAGE :—Influence upon the skin—
Upon the muscles—Upon the circulation—Upon the flow of
lymph and the process of absorption—Upon the nervous system—
Metabolism—Influence of massage upon metabolism.

THE pressure of deep massage exerts a simultaneous influence upon all the tissues of the body within its reach, *i.e.* upon skin, fasciæ, muscles, peripheral nerves, and the central nervous system, also upon blood-vessels and lymphatics.

Further, we must take into consideration that it affects the activity of the heart, helps the assimilation of food, and influences the general metabolism of the body.

INFLUENCE UPON THE SKIN

Its first effect upon the skin is to remove any excretory products which may embarrass its function. It then increases the cutaneous circulation, and has a beneficial influence upon the sensory nerve endings.

It must be remembered that respiration is carried out to a slight degree by means of the skin. Carbon dioxide is given off, and an equivalent amount of oxygen is absorbed. This process may be accelerated when the skin is kept in a good condition by massage.

“ Insensible perspiration when deficient may be increased, and the sebaceous excretions may be facilitated ” (*Graham*).

INFLUENCE UPON THE MUSCLES

The effect of massage upon muscle tissue is of vast importance. Under this heading is also considered its effect upon the removal of fatigue products.

Muscles in action exert a kind of massage upon each other.

The movements of the diaphragm in respiration make a continual passive movement with alternate pressure upon the organs above and beneath. When these movements are restricted by want of exercise or unsuitable clothing the results are well known; the health becomes greatly affected, and such troubles as indigestion and constipation appear.

The ordinary movements of the voluntary muscles are a means of accelerating the blood, by their alternate contractions and relaxations. At every contraction the blood is pressed out of the muscle, and at the same time it receives an impulse to return to the heart, while during each relaxation fresh blood comes from the deep vessels.

Over-activity in the muscles produces fatigue.

"Fatigue is an indication that waste is greater than repair. Muscular fatigue from over-exertion or want of exercise is relieved by massage. This promotes a more rapid absorption of waste products, and stimulates the tardy peripheral circulation upon which weariness to a large extent depends, thus showing a marked difference between the effects of exercise and those of massage" (*Graham*).

"Fatigue is produced when the muscles become loaded with certain toxic materials. These are chiefly acids, such as uric acid, butyric acid, lactic acid, and carbonic acid. These may be found free or combined in the form of carbonates in muscles which have become exhausted" (*Graham*).

The toxic materials must be removed from the tissues, in order to restore the normal functions of the body, and, as already seen, this can be accomplished by massage.

The result of forced inactivity is loss of tone, wasting, and impaired nutrition generally—such conditions may be remedied by massage. If the manipulations are applied regularly, the affected part will increase in size, strength, and firmness, the circulation will improve, and the limb return to its normal size and condition. This shows that massage may be an excellent substitute for exercise. It must not be concluded, however, that this is its sole purpose. Voluntary movement means exercise of the nervous system, as well as of the muscular, and many cases helped by massage are those of used-up nervous energy, in whom exercise in the

ordinary way would only increase exhaustion, but massage in such cases is very beneficial.

INFLUENCE UPON THE CIRCULATION

The influence of massage upon the circulation of fluids is of great importance. Both the venous and lymphatic circulation are accelerated by those manipulations which are performed from the extremities towards the heart. Deep manipulations cause the veins and lymphatics to be mechanically emptied, and the fluid cannot return, on account of the valves within the vessels. More space is thus made for blood returning from the deeper parts. The massage may be said to act both by pressure and by suction.

“Exercise accelerates the action of the heart, and after a time diminishes blood pressure, which means an increase in the rapidity of the current, and in the quantity of the flow through the relaxed, distended, or stretched blood-vessels. Massage also diminishes blood pressure, but without increasing the activity of the heart” (*Graham*).

Graham relates that careful experiments have proved changes in the blood of anæmic patients by applying massage. After a course of treatment the blood has been found to contain more red corpuscles and more hæmoglobin. It must not be supposed that massage has manufactured the corpuscles or the colouring matter, but it has been the means of bringing them again into the circulation, instead of their remaining dormant in the system.

INFLUENCE UPON THE FLOW OF LYMPH, AND THE PROCESS OF ABSORPTION

The influence upon the lymphatics has already been mentioned, along with the veins, but there is more to say on this important subject.

The lymphatics end in the tissues by minute openings through which they absorb the lymph, helping its onward flow in the lymphatic vessels. This process is helped by the action of the fasciæ which exert a certain pressure during voluntary and involuntary movements. While

blood is being returned to the heart by the veins, the lymphatics are gathering more slowly the fluid which has been bathing the tissues, and which has served for their growth and nutrition. The lymph-vessels carry back into the circulation that fluid which is not immediately required, as well as influencing largely the removal of waste matters. "The lymphatics in accomplishing this, besides their primary and peculiar function of endosmosis, are materially aided by their absorptive power and centripetal movement of lymph, by the pressure of the blood, by the natural elasticity of the tissues, and by the contraction and relaxation of the muscles. All these forces can be increased to a much higher degree by the externally applied pressure of massage, which being intermittent does not hinder the circulation" (*Graham*).

All serous sacs, *e.g.* the pleural and peritoneal cavities and those of the joints are in communication with the lymphatic vessels by means of minute openings. The fluid within these structures therefore is influenced by the natural movements in the body, and massage has a powerful effect upon the process of absorption within and around them. (See *Synovitis*.)

The effect of massage upon absorption in the abdomen is very important. The manipulations produce increased secretion in the glands of the alimentary canal, and so aid digestion and increase assimilation. This will be more fully described in the effects and use of abdominal massage.

The kings of the Sandwich Islands had themselves "lomi-lomied" (this was a form of massage), after every meal, as a means of aiding their digestion. "The external intermittent pressure over the abdomen would in all probability force the contents of the lacteals, or lymphatics of the small intestines, onwards, at the same time aiding them in their absorption of digestive products. A similar effect would be exerted upon the blood-vessels of the intestinal villi" (*Graham*).

INFLUENCE ON THE NERVOUS SYSTEM

By massage we stimulate the nerve endings which supply both motion and sensibility to the various parts of the body.

This stimulation is carried along the sensory fibres of a nerve to the spinal cord, and thence to the brain. There it is transmitted through another set of fibres to the part of the body from which the message was primarily sent. This stimulation and response is called reflex action. If the nerve or the spinal cord is diseased or impaired so that the communication is cut off, no reflex action results from any stimulus which may be applied to the nerve.

Good results produced by massage in mere states of nervous exhaustion are due to this process of reflex action. It has been continually demonstrated that massage has the power of renewing the vitality of the nerves and spinal cord in this way.

The nerve trunks can in some cases be directly affected by massage. In the treatment of neuralgia and neuritis such movements as vibrations and frictions may be used with great benefit, together with soothing strokings.

The activity of motor nerves may be modified by mechanical stimulation. By gentle pressure the irritability of motor nerves is increased. By strong pressure it is diminished or destroyed. Cramp may be stopped by a strong stationary pressure on the affected muscle.

Secretory nerves are affected by massage. This especially holds good with regard to abdominal manipulations.

Vaso-motor nerves can be influenced. A short and gentle stimulation applied to nerves containing both vaso-constrictors and vaso-dilators tends to produce a contraction of blood-vessels, but a strong and continued stimulation will produce dilatation. This result may often be seen after a massage séance. The skin becomes red and the part feels warm.

METABOLISM

The series of chemical changes taking place continually within the body are included under the term *metabolism*.

“The food that we take contains a store of potential energy which is converted into the kinetic form of heat and motion, by the chemical changes that go on in the tissues” (*Thornton*).

The first part is described as *anabolism*. It is a process by

which the protoplasmic cells build up their substance from the food supplied, by selecting materials from the blood. They also have the power of storing these materials for future use. The second part is described as *katabolism*. This includes the important process termed oxidation. Carbon and other substances in the tissues combine with oxygen from the air, producing CO₂ and other waste products, and so the protoplasmic materials are being continually used up or oxidised. The result of katabolism is the evolution of heat, the production of muscular movement, and the elimination of waste products, viz., carbonic acid, water, and urea.

THE INFLUENCE OF MASSAGE UPON THE PROCESS OF METABOLISM

Alteration in the production of body heat, muscular activity, and a reduced power of elimination may be present in many conditions of lowered nutrition. "Disorder of the body heat implies disorder of the circulation, of respiration, of digestion, of secretion, and of the nervous and muscular systems" (*Stretch Dowse*).

From the effects and uses of massage it has already been seen that these processes can be much benefited by the application of massage, the result being an improvement in the regulation of the temperature of the body, the muscles increase in size and strength, and waste products are eliminated with greater ease.

Patients suffering from nervous exhaustion, prostration, feebleness, and malassimilation are generally examples of disordered metabolism, but such conditions are seen to recover under the influence of massage and suitable diet.

Dr. Latham of Cambridge has written of gout, rheumatism, and diabetes: "In all these conditions we have changes showing themselves in the blood, the result of abnormal metabolism, either in the muscular or glandular tissue." Again, massage has often been known to produce a marked improvement in such cases.

The paralysed limb of a child, caused by anterior poliomyelitis, may be given as an example of how massage may

affect the process of metabolism in a local condition. In this it is necessary to consider the question of heat, in reference to nutrition, circulation, and metabolism. All these things are interfered with as the result of the paralysis. The limb is wasted, blue, and cold. Cold is unfavourable to nutrition, but heat may be promoted in the part by massage of the affected muscles, and by the same means the circulation and the general tone of the muscles and nerves are helped. The whole process results in an improved metabolic condition.

CHAPTER V

PRACTICAL MASSAGE :—Hints for learning massage—Arm—Wrist and hand—Elbow—Shoulder—Thigh—Hip—Back of the thigh—Knee—Lower leg—Foot and ankle—Back—Neck—Front of the neck and throat—Chest—Abdomen—Stomach—Liver—Small intestine—Colon—Details of manipulations—Effects of abdominal massage—General massage—Face massage—Head massage—Local heart treatment—General contra-indications to massage.

THE following hints will guide the student when learning and practising the various manipulations. These must be performed upon the human body.

Massage is learnt to the best advantage in a class, the pupils working in turns upon each other as models. It is important for the pupil to feel the manipulations of the teacher, as well as those of her fellow-students.

The pupil should ensure and maintain the best possible position in which to do her work, and if standing the feet should be well parted to give a steady base. The comfort of the model should be considered, and throughout all manipulations the part worked upon must be well supported, and the muscles entirely relaxed.

In the following order of movements arranged for practice, effleurage is mentioned at the beginning, but it may also be used frequently between and after the other manipulations. When the pupil becomes proficient enough to treat patients, she should adhere to the order of movements as she has learnt them, as much as possible.

Throughout these notes the "model" already spoken of is referred to as the "patient."

ARM

Position.—For the patient, sitting. For the masseuse, also sitting, but the seat should be a little higher than the patient's,



FIG. 9.—EFFLEURAGE OF THE ARM. MIDDLE OF THE STROKE.



FIG. 10.—EFFLEURAGE OF THE ARM. END OF THE STROKE.

for the masseuse has thus more strength and freedom than is possible when sitting on the same level as the patient.

Effleurage, from wrist to shoulder, first with one hand, then the other. Then both hands together. The strokes must be carried well up into the axilla. If the forearm only is treated, then the strokes finish at the elbow.

Petrissage of biceps, triceps, and deltoid. Kneading of the upper arm. (This is sometimes continued to the wrist.) Picking up of the muscles and fatty tissues.

FOREARM

Petrissage of the supinators. Kneading of the flexors and extensors with the base of the hand. Wringing. Hacking and clapping over the whole surface from the shoulder to the wrist.

In some cases it is well to massage in the following order—hand, forearm, upper arm, instead of beginning at the shoulder.

WRIST AND HAND

Position.—For the patient, sitting; the hand supported on a firm but padded surface. For the masseuse, sitting or standing.

Effleurage of the whole hand, on the palmar and dorsal surfaces, finishing the stroke just above the wrist (sometimes it may be carried to the elbow).

Effleurage of the fingers, the masseuse holding the patient's finger at the tip with one hand, while she performs effleurage with the other. The movement can be done with the tips of the three fingers.

Effleurage of the thumb, the masseuse supporting the patient's thumb by laying it along her own, and performing the movement with the thumb of the opposite hand.

Friction of the wrist, on the anterior and posterior surfaces, and over the dorsum and palm of the hand, working up and down between the metacarpal bones.

Friction of the fingers and thumb, holding in the same way as for effleurage, and the movement is performed with the ball of the thumb of one hand.

Petrissage of the thenar and hypo-thenar eminences done as a picking-up movement with the fingers and thumbs.

Hacking and clapping (sometimes omitted).

The muscles of the forearm are usually treated with the wrist and hand.

ELBOW

Position.—For the patient, sitting. The elbow and forearm supported upon a firm but padded surface. For the masseuse, sitting or standing.

Effleurage with one hand over the outer side, and with the other over the inner side.

Frictions all round the joint.

Hacking.

Massage of the muscles above and below the joint.

SHOULDER

Position.—The same as for arm, the masseuse sitting a little higher than the patient.

Effleurage (*a*) With first one hand and then the other, carrying the stroke over deltoid to the axilla on the opposite side. The non-working hand is free to support the joint. (*b*) With both hands, and carrying the thumbs over the joint, finishing the strokes in the axilla.

Frictions all round, following the line of the joint and working carefully round the acromion process. Caution is necessary when passing over the nerve trunks in the axilla. The excursions may be made two or three times, each one occupying about 4 minutes. The masseuse must support the joint throughout with her non-working hand.

Petrissage of all the muscles, working on the shoulder-joint.

Hacking, (clapping, beating).

THIGH

Positions.—For the patient : (*a*) Lying, with the leg slightly flexed. The masseuse stands at the side. (*b*) Sitting, with back supported. The masseuse sits in front, and to the



FIG II.—PETRISSAGE OF THE ARM.

outer side of the leg treated. She takes the limb on to her knee. In this position she can fix her elbow against her own thigh or hip, and thus gain more power.

Effleurage, with one or both hands. The whole surface must be covered, and it depends upon the size of the thigh as to how many strokes must be used. Those carried up the inner side end in the groin. Those up the outer side over the great trochanter, or else the hand is carried over the hip-joint, and the stroke also ends in the groin.

Petrissage of the adductors. Petrissage or kneading with the base of the hand down the outer aspect of the thigh. Petrissage of Rectus femoris (with the leg fully extended), with one or both hands, taking a wide grasp. Kneading, both hands working alternately, first grasping the muscles on the inner and outer sides, then on the upper and under surfaces of the limb. Picking up of adductors. Hacking and clapping over the whole surface.

FRONT OF THE HIP-JOINT

Position.—The patient lies supine, with knee and hip semi-flexed. The masseuse stands on the side of the hip she is treating.

Effleurage, with one hand, from without, inwards, carrying the stroke to the groin.

Frictions, across the line of the joint, and round the great trochanter.

Hacking, all over the area treated with effleurage and frictions.

BACK OF THE HIP-JOINT

Position.—The patient lies prone. The masseuse stands on the opposite side of the hip treated.

Effleurage of the gluteal region. The strokes must begin from the centre, and be carried out towards the groin in a fan-shape. One or both hands may be used.

Kneading, with the base of the hand. It is often suitable to work with one hand over the other.

Frictions, done deeply with the finger-tips of both hands. Picking up of all the muscles and fatty tissues.

Hacking, clapping, beating, the last being the form of tapotement most used in this region.

Vibrations are sometimes given over the gluteal region for soothing pain (see Sciatica treatment).

BACK OF THE THIGH

If it is necessary to massage the hamstring muscles with more detail than that already described, it is usually done after the gluteal region, the patient maintaining the prone position. The masseuse stands on the same side as the leg treated.

Effleurage, from the knee to the gluteal fold.

Petrissage, with one or both hands, as given on Rectus femoris.

Frictions and vibrations down the sciatic nerve (see Sciatica treatment).

Hacking and clapping.

KNEE-JOINT

Positions.—For the patient: (a) Sitting, with back supported. The masseuse sits in front, somewhat lower, and supports the patient's knee on her own. (b) Lying, with the knee fully extended, or slightly flexed. The masseuse stands at the side.

Effleurage. (a) Begin the stroke on the outer side with one hand, carry it up over the joint, and end it on the inner side, supporting with the opposite hand. (b) Begin the stroke on the inner side, carry it up over the joint, and end it on the outer side. (c) Both hands together, carry the thumbs over the front, and then over each side, ending underneath the joint. (d) Let the fingers of both hands meet behind, and just below the joint; carry the stroke up above, and finish it behind.

Frictions, with one hand all round the patella, supporting the joint with the other hand two or three times. (One excursion round the patella may occupy 4 minutes.) Friction along the line of the joint, on each side and at the back.



FIG. 12. — KNEADING OF THE THIGH.

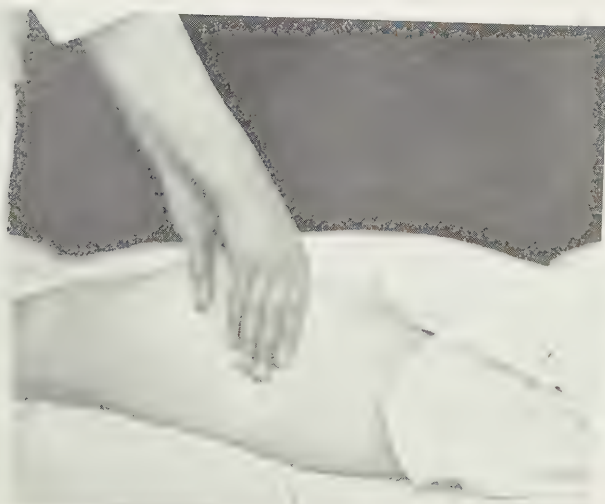


FIG. 13.—PETRISSAGE OF RECTUS FEMORIS.

Petrissage of the muscles above and below the joint.
Hacking and clapping.

LOWER LEG

Positions.—For the patient: (a) Lying, with the knee flexed and the foot supported. The masseuse stands at the side. (b) Sitting with back supported, the masseuse sitting in front, supporting the patient's foot on her knees. The patient's knee must be flexed to ensure relaxation of the calf muscles.

Effleurage, with one or both hands, beginning on each side of tendo-achilles, and carrying the stroke up each side of the leg to the back of the knee-joint. If a large surface must be covered a separate stroke may be used up the front and back of the leg. A stroke up the back of tendo-achilles may be done, allowing the tips of the fingers of both hands to meet each other.

Kneading of the calf muscles down each side of the leg, using one hand, and supporting with the opposite hand.

Kneading of Tibialis anticus with the base of the hand. Petrissage, wringing, and picking-up of the calf muscles.

Hacking and clapping.

FOOT AND ANKLE-JOINT

Positions.—For the patient: (a) Sitting. The masseuse takes the foot on her knee, sitting a little lower than the patient, and on the outer side. (b) Lying. The masseuse stands at the side.

Effleurage. (a) With both hands, one on the plantar, the other on the dorsal surface of the foot. (b) With one hand up each side of the foot. (c) With the finger-tips of both hands up each side of tendo-achilles.

Kneading, with the base of the hand on the dorsal and plantar surface of the foot.

Frictions, working first round the external malleolus, across the line of the joint and round the internal malleolus or *vice versa*. On each side of tendo-achilles. On the dorsal surface of the foot, up and down between the metacarpal bones.

On the plantar surface, and especially along the inner border if the treatment is for flat foot. Sometimes the tissues on the sole of the foot become very hardened ; then it is necessary to friction with the knuckles instead of the tips of the fingers.

Hacking and clapping. The latter may be done on the plantar and dorsal surface, the hands clapping together instead of alternately. It is a useful method for warming the feet.

BACK

Position.—For the patient, lying prone. The masseuse stands at the side (the left is the most convenient).

The patient should wear a loose garment which opens down the back. The head must be supported on the couch without a pillow, and the face turned to the right or left.

Effleurage. (*a*) Begin the strokes over the gluteal regions, one hand on each side, carry them up over the angles of the ribs to the axillæ, and finish definitely there. (*b*) A similar stroke, but allow the thumbs to meet over the spinous processes. Also finish in the axillæ.

Kneading (also here called friction) with the base of the hand. A large stroke working on the muscles on each side of the spine, from the shoulder to the gluteal region. It may be done with one hand or both (one over the other to give extra power).

Kneading, with both hands, one each side of the spine. The hands move simultaneously and work from shoulders to gluteal region. A useful soothing movement, *e.g.* for Insomnia.

Frictions down the spine, on each side, from the base of the skull to the sacrum. The circular movements should be performed with the tips of all the fingers lying in a row, close beside the spinous processes.

Frictions may also be given with the tips of the fingers of one hand, or the pad of the thumb, each excursion moving towards the spine.

Frictions with the finger-tips are sometimes necessary over the scapula and intercostal muscles.

Hacking. May be applied in several ways. (*a*) Spinal



FIG. 14.—KNEADING THE BACK.



FIG. 15.—FRICTIONS DOWN THE SPINE.

hacking. The movement is performed continuously, down each side of the spine, from the base of the skull to the sacrum. The hacking must be very light in the cervical region, and gradually stronger in dorsal and lumbar regions. As the hands descend, many strokes must be made, as they ascend only a few strokes are made (4 to 6). (b) Diverging hacking. The movement is performed down each side of the spine, but the hands pass outwards and to the angle of the ribs, and back to the spine, while the hacking is done. When the ribs are passed, the spinal hacking is continued as above. (c) Hacking across the muscles, first on one side of the spine, and then the other, covering the whole surface.

The spinous processes must be avoided during hacking.

Clapping, all over the back, from shoulders to gluteal region.

Vibrations, with the whole hand all over the back.

Running vibrations, with the tips of the fingers down each side of the spinous processes.

NECK

Position.—The patient sits on a stool, leaning her arms on a table or plinth in front. The head must be supported. The masseuse stands behind.

Effleurage. (a) Begin the stroke with both hands at the level of the axillæ, and carry them up over Trapezius, ending with the thumbs lying parallel to and above the clavicle. (b) Down the sides of the neck to the clavicle, working with the hand of the opposite side. (c) With one hand from the back, carrying the stroke over Trapezius to the clavicle, working with the hand of the opposite side.

Kneading, with the base of the hand. Picking up of Trapezius.

Friction, with the finger-tips, down each side of the spine, and over the scapula muscles.

Hacking, on one side at a time across the muscles, or diverging. The strokes must be very light in the cervical region, and stronger on the shoulders.

Clapping is not often used on the neck.



FIG. 16.—PICKING UP OF TRAPEZIUS.

FRONT OF THE NECK AND THROAT

Position.—The patient sitting upon a stool. The masseuse stands behind and supports the patient's head against her chest.

Effleurage. (a) Let the ulnar borders of the hands meet under the patient's chin, and carry the strokes down to the clavicles. (b) With one hand down the front of the neck. (c) With one hand down each sterno-mastoid muscle.

Friction and petrissage of the sterno-mastoid muscles. Friction (gentle) down each side of the trachea.

Vibrations and shakings of the larynx and pharynx.

CHEST

Position. —For the patient, lying, but with the shoulders well raised.

Effleurage. (a) Down each of the sterno-mastoid muscles. (b) With both hands up the sternum, then carrying the strokes out to the axillæ. (c) With both hands down the sternum, then carried out each side, over the lower ribs.

Petrissage and kneading of the pectoral muscles.

Frictions of the sterno-mastoid muscles, also above and below the clavicles and on the intercostal muscles.

Hacking, which must be done lightly.

All these manipulations must be done round the breasts and never upon them.

ABDOMEN

Position. —For the patient, lying with knees flexed. The shoulders must be slightly raised, and the back well supported on a plinth or bed. The masseuse stands or sits at the right side.

Manipulations

(a) For the stomach.

Stroking and kneading, definitely following the course of the contents of the stomach.

Stomach-pit shaking.

Stomach shaking.

(b) For the liver.

Stroking from out, inwards.

Kneading, hacking, beating, pressing, and vibrations.

(c) For the intestines.

Transverse stroking and kneading.

Circular kneading.

Colon stroking, kneading, and frictions.

Lumbar side stroking and shaking.

Transverse abdominal shaking.

Vibrations.

(d) For the muscles and fatty tissues.

The picking-up movement.

Details of Manipulations

Stomach-pit Shaking.—The masseuse places her hands at the pit of the patient's stomach, *i.e.* just below the ensiformis, with the palms facing each other and the fingers close together. The finger-tips rest on the patient's skin, and a vibration shaking movement is performed, while a slight pressure is made in an upwards direction. The movement is repeated three to eight times. The patient breathes deeply, and the shaking is performed during expiration.

Stomach Shaking.—The masseuse stands on the left side to perform this movement, facing the patient's feet.

The tips of all the fingers must be placed in a row along the greater curvature of the stomach, *i.e.* just below the border of the ribs, on the left side.

The patient breathes deeply, and during expiration the masseuse performs a vibration shaking, with slight pressure inwards and upwards. This also may be done 3 to 8 times.

Manipulations for the Liver.—It is the most convenient for the masseuse to remain on the left side, though these movements can also be done from the right.

The patient must lie on the left side.

Stroking, with the left hand, from the back, round to the ensiformis.

Kneading, hacking, beating, most conveniently done with one hand.

Pressing or squeezing. One hand is placed behind and the other in front of the liver, and a stimulating squeezing movement performed with slight shaking. It may be done 6 to 8 times.

Vibrations, with the whole hand.

Manipulations for the Intestines

Transverse Stroking.—A preliminary movement, and also used between others.

Transverse Kneading.—The hands are placed in the centre of the abdomen, overlapping each other, and a large side-to-side movement performed. The intestines should be grasped as much as possible. Care must be taken not to press upon the iliac crests.



FIG. 17.—TRANSVERSE KNEADING OF THE ABDOMEN



FIG. 18.—COLON FRICTIONS.

Circular Kneading.—The hands are placed as before, and a circular movement performed. The base of the hands, the ulnar borders, and the tips of the fingers are alternately pressed into the abdomen.

Colon Stroking.—Performed along the course of the colon, the palms and dorsal surfaces of both hands being used, viz.: Up the ascending colon, the dorsal surface of the right hand lies upon the patient's skin, the left hand lying upon it with the palm uppermost. The hands turn sharply at the hepatic flexure, and the stroking is continued along the transverse colon. They turn again sharply at the splenic flexure, and here the palm of the left hand lies upon the skin, with the right hand over it, and the stroke is continued down the descending colon. The stroking may be done slowly, or briskly, according to the effect required. Extra stroking is sometimes necessary down the descending colon. It may be given 6 to 12 times.

Colon Kneading.—Performed along the course of the colon from the cæcum to the sigmoid flexure, with the base of the hand. It may be given 2 or 3 times.

Colon Frictions.—These also follow the course of the colon as in kneading. This manipulation is very important and may occupy from 5 to 15 minutes of the abdominal treatment.

The frictions are done with the tips of the fingers of both hands, working close together. The patient should never feel the finger-nails, and the masseuse should guard against pinching minute portions of skin. The movement is performed slowly, circular excursions being made over every part of the colon. It is essential that the circles move with a view to pressing along the contents of the colon; they must therefore move upwards along the ascending, from right to left along the transverse, and downwards along the descending colon. This is the most usual method of treatment, but in some cases it is advisable to work backwards, *i.e.* treat—descending, transverse, and then ascending colon. If this method is followed, the circular frictions must still be working in the direction of the course of the contents of the bowel. If the descending colon seems loaded, it is sometimes well to treat it first, and give extra frictions upon it.

Lumbar-side Stroking. The masseuse places both her hands behind the patient, on each side of the spine in the lumbar region. She draws her hand sharply round to the front, as much as possible over the ascending and descending colon. At the end of the stroke the hands meet in front.

Lumbar-side Shaking.—This is done in the same way as the above movement, but as the hands are drawn forwards a shaking vibration movement is performed.

Either of these movements may be given 4 to 10 times each.

Transverse Abdominal Shaking.—One hand is placed in the centre of the abdomen, grasping the tissues. A movement is done beginning with a vibration, and increasing to a definite shaking, which again decreases to a vibration. During this manipulation the hand gradually sinks into the abdomen, and is lifted again.

Vibrations.—These may be performed all over the abdomen, with one or both hands.

The picking-up movement has already been described on page 12.

General Effects of Abdominal Massage

1. The abdominal walls and the muscles of the intestines are strengthened, thereby increasing peristaltic action.
2. Digestion is improved on account of the increased flow of digestive juices.
3. There is increased absorption in the stomach and intestines.
4. The portal circulation is increased owing to the alternate pressure given on the abdomen.
5. The flow of lymph is increased.
6. It is sometimes the means of absorbing the products of inflammation, and stretching adhesions.

Special Effects of Manipulations

Stomach-pit Shaking.—This movement acts chiefly on the pyloric end of the stomach. It stimulates the nerves in the neighbourhood, also the glands, causing an increased flow of juices.

It is used in the treatment of chronic gastric catarrh and dyspepsia, also for atony and dilatation of the stomach.

Stomach Shaking.—This movement is done over a larger area than the former, and is more effective in increasing peristalsis, and stimulating the mucous membrane.

Effects on the Liver.—The stroking is soothing, but the other manipulations are stimulating, causing an increased flow of bile, and improving in general the functions of the liver.

Effects on the Intestines.—The strokings are soothing. Colon stroking helps along the contents of the bowel. The kneadings and colon frictions are stimulating, and improve the muscle tone. They also help peristalsis, and the flow of juices.

Lumbar side stroking and shaking, also transverse abdominal shaking, are stimulating to the abdominal organs. They are much used in the treatment of chronic constipation.

Vibrations are soothing. They may be used over painful areas, and can sometimes be applied when other manipulations are contra-indicated. Some Swedish gymnasts apply vibrations to the abdomen in the treatment of diarrhœa.

Contra-indications to Abdominal Massage

There are many conditions and changes during which abdominal massage must not be applied. The following are important examples:—

Pregnancy, throughout its course (except under very special circumstances).

The menstrual period.

Any acute inflammation, *e.g.* peritonitis, perimetritis, abscess of the liver, etc.

Certain conditions of the kidneys, ureter, and bladder, *e.g.* stone.

Tumours, ovarian cysts, gall-stone, strangulated herniæ.

Acute catarrh, and ulceration of any part of the alimentary tract.

Any condition where there is danger of hæmorrhage due to ruptured blood-vessels, as abdominal massage raises the blood pressure.

After recent bleeding from the brain, lungs, stomach, or from an aneurism.

GENERAL MASSAGE

The term "General Massage" is applied to treatment of the whole body, except the head and face.

Position. The patient is in bed lying supine, with head and shoulders raised on a pillow.

Time: 40 minutes to 1 hour 15 minutes.

The masseuse should not exceed the time considered suitable for the patient's treatment. Much practice is necessary to allotting a definite time to each part of the body. The patient's comfort must always be remembered.

Breathing exercise—*e.g.* chest lift stroking, 4 to 6 times.

Then some or all of the following movements for each part:

Legs: 10 to 15 minutes each.

Foot: effleurage, kneading, frictions, hacking, clapping; passive movements in toes and ankle-joints.

Lower leg: effleurage, kneading, petrissage, wringing, hacking, clapping.

Knee-joint. Effleurage, frictions.

Thigh. Effleurage, petrissage, kneading with both hands, hacking, clapping.

Effleurage, from ankle to hip.

Passive movements in knee and hip.

Arms: 5 to 8 minutes each.

Hand: effleurage, kneading, frictions.

Arm: effleurage from wrist to shoulder, with one or both hands. Petrissage of all muscle groups.

Kneading from shoulder to wrist, hacking, clapping.

Passive movements in fingers, wrist, elbow, and shoulder

Back: 5 to 10 minutes.

Position.—Lying prone.

From the waist to axillæ, and over Trapezius: effleurage, kneading, frictions, hacking, clapping.

The lumbar and gluteal regions: effleurage, kneading, frictions, hacking, clapping.

Chest: 3 to 6 minutes.

Position.—Lying supine.

Effleurage, frictions, petrissage of the pectoral muscles, hacking.

Abdomen : 5 to 15 minutes.

Stroking, transverse and circular kneading, colon stroking and frictions, lumbar side stroking.

Treatment for the stomach and liver may be added if necessary.

FACE MASSAGE

Face massage improves the circulation and nutrition of the tissues. It aids the distribution of subcutaneous fat, and so may help to remove wrinkles. Its chief use, however, is for the treatment of nerves. Those to which massage may be applied are—branches of the trigeminal (the 5th cranial nerve), and of the facial (the 7th cranial nerve).

It is applied for the relief of neuralgia and neuritis, and for paralysis in the case of the 7th cranial nerve.

The accessible branches of the 5th cranial nerve are—the supra-orbital, the supra-trochlear, the infra-orbital, and the mental nerves. These are in pairs on each side of the face.

Position.—For the patient, sitting, with back and head well supported. The masseuse stands at the side. Time : 10 to 20 minutes.

Manipulations

Effleurage. (a) With the thumbs on the forehead, working towards the bridge of the nose. (b) Down the side of the face with one hand. (c) Over the cheeks, beginning the strokes with the thumbs lying on each side of the nose. (d) With the thumbs passing over the mental nerves.

Soothing stroking, vibrations and frictions, on all the nerves mentioned above. Soothing stroking over the whole face.

In facial paralysis special attention must be paid to the paralysed side.

Effleurage is given as above, but other movements are of a stimulating nature. Kneading, frictions, vibrations, hacking all over the affected area. This will be described further in notes on facial paralysis.

Time for the treatment : 15 to 30 minutes.

Contra-indications to Facial Massage.—During a cold in the head. During swollen glands, or any inflamed condition.

HEAD

Head massage is used in the treatment of rheumatism. It helps to break up inflammatory products in the scalp, and so relieves headache which is of rheumatic origin.

It is sometimes given to relieve a feeling of weight in the head in neurasthenia. Only a short treatment must be given to produce this effect.

Position.—For the patient, sitting, with back supported, but not the head. The masseuse stands at the front or side. The patient's hair must be quite loose.

Manipulations

1. *Stroking.*—The masseuse holds her hands somewhat claw-shaped, allowing her fingers to pass through the patient's hair. The finger-tips should be felt upon the scalp without scraping, and the hair lifted behind at the end of each stroke. This movement is repeated between the others following. Time: 1 to 2 minutes.

2. *Light Hacking.*—This is carried out in a definite pattern. The hair should be parted down the centre, and the hands follow the course of the parting on each side. The strokes are carried round to the back of the head and to the sides over the ears, then back to the starting-point. The movement is repeated, the hands working a little farther apart each time, till the whole surface of the head has been covered. Time: 1 to 2 minutes.

3. *Point Hacking.*—The fingers of each hand are gathered together, and firm taps are made alternately all over the head, following the same course as in light hacking. Time: 1 to 2 minutes.

4. *Frictions.*—This is the most important manipulation. The masseuse supports the patient's head against her chest, standing at the side. Frictions are performed with the finger-tips all over the scalp. It is important to move the tissues with each stroke, and a grating noise must not be heard. Time: 10 to 15 minutes.

5. *Stimulating Stroking or Combing.*—The hands are carried through the hair in the same way as described in number 1, but this movement is done very briskly. Great care must be

taken not to pull the patient's hair. If a soothing effect is required, this movement is omitted. Time: 1 to 2 minutes.

6. *Vibrations*.—These are done with one or both hands placed on the patient's head. The masseuse stands at the back or the front. Time: 1 to 3 minutes.

7. *Light Brushing*.—The hands are passed alternately and lightly over the patient's head, hardly touching the hair. The stroke may be carried down to the shoulders. This is a very soothing movement, and is useful in the treatment of insomnia. Time: 1 to 4 minutes.

MESSAGE OF THE HEART OR LOCAL HEART TREATMENT

The manipulations applied in the region of the heart form only a small portion of the treatment given to cardiac cases. (See p. 177.)

Positions.—For the patient, sitting, with back, head, and feet supported; or lying. The masseuse stands at the right side.

1. Soothing stroking over the heart. (This is repeated between each of the following.)

2. Light hacking.

3. Special tapotement over the heart. One hand is curved and carried backwards and forwards with an even swing, during which the palm of the hand touches the chest with a gentle tap. It is done in time with the heart beat.

4. Vibration.

This series is generally twice repeated. Time: 3 to 5 minutes.

Effects and Uses.—The hacking is stimulating to the heart muscle and nerves, causing stronger and less frequent contractions. The special tapotement gives a rhythmical stimulation, which regulates the contractions. The vibrations and strokings are soothing.

GENERAL CONTRA-INDICATIONS OF MESSAGE

There are many abnormal conditions when massage must not be applied.

The following are important examples:—

When the temperature of the body is raised above 100°.

Certain abnormal conditions of the skin, *e.g.* burns, erysipelas, syphilitic eruptions, etc.

Some diseases of the blood-vessels, especially when the vessels are in a brittle condition. If massage is ordered in such cases, great care must be exercised.

Acute varicose veins, phlebitis, lymphangitis, thrombosis, cancer and tumours, tuberculous bone and osteo-myelitis.

CHAPTER VI

THE PASSIVE AND ACTIVE MOVEMENTS USED WITH MASSAGE :—Passive movements—Effects and uses—Active movements—Muscle work—Concentric, eccentric, static—Uses of various kinds of muscle work—The ranges of working muscles—Effects and uses of active movements—Practical hints on giving movements—Movements in the upper extremity : fingers, thumb, wrist, elbow, shoulder—Movements in the lower extremity : foot, ankle, knee, hip—Head and neck movements.

THE use of passive and active movements as an adjunct to massage is very important.

PASSIVE MOVEMENTS

Passive movements are those performed in a patient's joints, by an external force (the masseuse), without volition by the patient.

The Effects and Uses are :—

1. To increase mobility in the joints. This is often a great necessity after injuries. In such cases ligaments and soft tissues are stretched, adhesions broken down or their formation prevented.

2. The circulation in the veins is helped. The movements cause an alternate lengthening and shortening of the vessels, and the blood within them is pressed on towards the heart. For this reason they are often given with general massage.

ACTIVE MOVEMENTS

Active movements are those performed by the voluntary effort of the patient.

When movement takes place in the ordinary way, it is due to the contraction of a muscle or muscles, as the result of a nervous impulse.

These movements may be "free," *i.e.* done by the patient alone ; or "resisted," *i.e.* done with the help of another person. Resistance may be given to increase the strength of the movement, or it may be applied to make a certain group or groups of muscles work in a particular way. This must be further explained. Writers of Swedish gymnastic methods have classified these resisted active movements according to their muscle work as concentric and eccentric movements.

Concentric Muscle Work.—The masseuse holds the patient's limb, and tells the latter to perform a movement. While this is done, the masseuse gives resistance, little or much according to circumstances. While this movement takes place, the origin and insertion of the working muscle are getting nearer to each other, and the muscle becomes thicker in the centre. The patient does the movement, the masseuse resists.

Eccentric Muscle Work.—The masseuse again holds the patient's limb, but she performs the movement, telling the patient to resist. While this takes place, the origin and insertion of the working muscle are drawn farther apart, and the muscle is becoming longer. The masseuse does the movement, the patient resists.

In some cases eccentric work takes place when the weight of the body or part of it is a factor in performing a movement. Examples of this will be seen in the free exercises given in a later chapter.

Static Muscle Work is another form, but is seldom required with massage. No movement is performed, but if a limb or any part of the body is placed in position, the muscles work statically to keep that position. The performance of static muscle work is also called "holding."

The Uses of Concentric, Eccentric, and Static Muscle Work.—Concentric work is most frequently used ; it is given to muscle groups which work antagonistically to each other, *e.g.* flexion and extension, and used to strengthen equally both groups of muscles.

Eccentric work is generally given combined with concentric. Its great use is, that one muscle group only can be

exercised. This is important in the treatment of recovering hemiplegia. The extensors are frequently weaker than the flexors, and by giving concentric and then eccentric work to the extensors, this group only is exercised, and the flexors remain passive. This kind of muscle work is also required in the treatment of deformities.

Static work increases the strength of the muscles for which it is given.

THE RANGES OF WORKING MUSCLES

A muscle works in its whole range by performing a movement from its most stretched position to its fullest contraction. A muscle works in its inner range by performing a movement from a point midway between full stretching and full contraction to its fullest contraction.

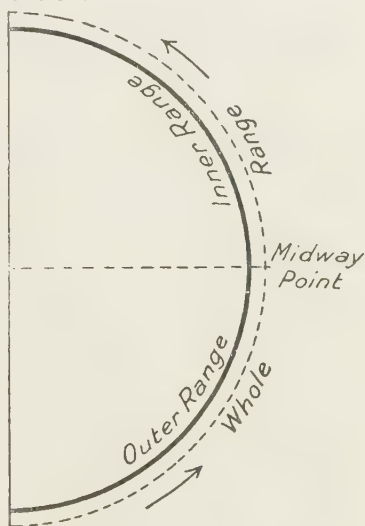
A muscle works in its outer range by performing a movement from its most stretched position to the point midway between full stretching and full contraction.

Muscle work in the inner range is used with the object of shortening an overlengthened muscle.

It is the form required in the treatment of the lengthened muscles of all deformities.

Muscle work in the outer range is used with the object of

*Point of fullest
Contraction.*



*Point of fullest
Stretching.*

FIG. 19.

bringing fresh blood and nutrition to the muscle group, without carrying the contraction to its fullest limit.

It is also a means of teaching muscle control to a nervous patient, *e.g.* in chorea.

The above description applies to concentric muscle work in the different ranges. When eccentric work is necessary the movement is done in the opposite direction.

Effects and Uses of Active Movements

1. The supply of blood to the working muscles is increased, and therefore their nutrition is improved.
2. The muscles develop and grow stronger.
3. Mobility in the joints is increased.
4. The circulation in the veins is improved.
5. The contractions of the heart become stronger.
6. The nervous system is exercised and developed.
7. The process of metabolism is increased.

PRACTICAL HINTS ON GIVING MOVEMENTS

1. The patient's position must be comfortable, and support given to the limb concerned in the movement.
2. The masseuse may stand or sit, but her position must be firm.
3. All grasps must be taken with a broad, flexible hand, and must be firm and comfortable to the patient.
4. During all movements the masseuse must avoid pressing a joint down, but give a gentle tension upwards.
5. All movements are taken to their full limit. At the beginning and end of passive movements the masseuse gives an over-stretching of the joints. At the end of an active movement, the masseuse carries the movement a little farther passively than the patient can do actively.

Note.—There are some exceptions to this rule, *e.g.* in the treatment of recent injuries.

6. Resistance when given should be very regular, and should last from the beginning to the end of a movement.

7. The masseuse modifies her resistance, according to the patient's strength. The movement should never be a struggle between the two.

8. In giving active movements the masseuse always tells the patient what he is required to do, *e.g.* the masseuse says—bend, stretch ; lift up, draw down, etc.

9. All rollings are given as passive movements, and are used to increase mobility and circulation. In giving the following movements actively, the muscle work is concentric unless otherwise stated.

MOVEMENTS IN THE UPPER EXTREMITY

Position.—For the patient, sitting. For the masseuse also sitting, but she should be higher than the patient.

FINGER-JOINTS

Finger Rolling.—The masseuse supports the elbow on her knee. The metacarpo-phalangeal joints are fixed by one hand, and the tops of the fingers grasped with the other. The fingers are carried in large circles in both directions. 6 to 12 times.

Finger Flexion and Extension.—The Position and Holding are the same as those for rolling, but the masseuse places all the fingers of one hand over the patient's fingers.

Passively, she flexes the fingers into the hand, raises them up again, and gives an over-stretching. 6 to 12 times.

Actively, the patient alternately flexes and extends, the masseuse resisting, and giving an over-stretching at the beginning and end. 6 to 12 times.

THUMB-JOINT

Thumb Rolling.—The masseuse fixes the carpo-metacarpal joint with one hand, and with the other carries the thumb in large circles in both directions. 6 to 12 times.

Thumb Flexion and Extension.—Passively and actively, as for the fingers. 6 to 12 times.

Thumb Abduction and Adduction.—The holding the same as that for rolling ; the thumb is alternately carried to the side of the hand, and abducted as far as possible. Passively and actively. 6 to 12 times.

Passive movement performed individually in every joint

of the fingers and thumb is often necessary to increase mobility in old-standing cases after injuries. The hand is then supported horizontally and each joint held with one hand, while the movement is done with the other. 10 to 40 times.

WRIST-JOINT

Wrist Rolling: Positions.—The same as for finger rolling, or with the forearm horizontal and supported.

The masseuse holds the patient just below the wrist with one hand, and with the other over the metacarpo-phalangeal joints. With the latter hand she carries the wrist in circles, as large as possible, in both directions, but the wrist being a condyloid joint, it is impossible to perform a perfect circumduction. 6 to 12 times.

Wrist Flexion and Extension or Volar and Dorsal Flexion.—The position and grasp are the same as for rolling. Passively, the masseuse carries the hand alternately to full flexion and extension, giving a slight tension upwards of the joint all along. 4 to 8 times.

Actively, the patient alternately flexes and extends, the masseuse resisting and giving a slight over-stretching at the beginning and end. 4 to 8 times.

Radial and Ulnar Flexion.—The position and grasp are the same as for rolling. Passively, the masseuse carries the hand alternately towards the radial and ulnar borders of the wrist, also giving some tension upwards. There is much less radial than ulnar flexion in a normal wrist-joint. The movement must be kept purely lateral throughout. 4 to 8 times.

Actively, the patient carries the hand in the same directions, the masseuse resisting. 4 to 8 times.

SUPERIOR AND INFERIOR RADIO-ULNAR-JOINTS

Pronation and Supination.—The patient's forearm rests horizontally upon a table or firm pad. The masseuse stands and grasps the patient's hand, as if shaking hands. Right hand with right, and left with left. The opposite hand grasps the patient's wrist (this holding is specially used for injured wrists), or supports the elbow.

Passively, the masseuse alternately pronates and supinates the forearm. If the first holding is used, the masseuse's supporting hand moves round with the patient's. The joint



FIG. 20.—THE HOLDING FOR PRONATION AND SUPINATION.

must be kept fully extended, and no twisting is allowed. 4 to 8 times.

Actively, the patient pronates and supinates, the masseuse resisting. 4 to 8 times.

ELBOW-JOINT

Elbow Flexion and Extension.—The patient's elbow lies within the masseuse's hand upon the table, close to the edge. The masseuse stands, and with her other hand grasps the patient's wrist.

Passively, the masseuse fully flexes and extends the forearm, giving a slight over-stretching at the beginning and end. 6 to 12 times.

Actively, the patient flexes and extends, the masseuse resisting.

Note.—The elbow-joint requires much care after injury. It is necessary to give the movements in small excursions at first, and gradually increase first the flexion and then the extension, until the full range of movement is attained.¹

SHOULDER-JOINT

Position.—For the patient, sitting upon a stool. The masseuse stands at the side, her feet well parted.

Circumduction or Arm Rolling.—If giving movement to the right arm, the masseuse allows the patient's forearm to lie along her own (right), and she supports the inner side of the elbow. Her left hand supports the outer side of the joint. The arm is carried in large circles in both directions. 6 to 12 times.

If there has been any injury near the shoulder-joint, it is sometimes well to place her left hand over the (right) shoulder to fix it (fingers in front, thumbs behind).

Abduction and Adduction.—The position and holding are the same as for rolling.

Passively, the masseuse raises the arm to a horizontal line with the shoulder, and then carries it back to the side of the body. 4 to 8 times.

Actively, the patient performs the same movement, the masseuse giving resistance. 4 to 8 times.

Flexion and Extension. If giving movement to the right arm, the masseuse holds the patient's wrist with her left hand, and supports the flexed elbow with her right.

Passively, the masseuse carries the arm backwards and forwards as far as possible, or across the chest and then backwards. 4 to 8 times.

Actively, the same movements are performed by the patient, the masseuse resisting. 4 to 8 times.

¹ See "Treatment of Fractures near Elbow."

Rotation.—The masseuse takes the same holding as for flexion and extension, but the arm is kept in the abducted position, and the forearm at right angles to the upper arm.

Passively, the masseuse turns the arm inwards and outwards. 4 to 8 times.

Actively, the patient alternately turns the arm inwards and outwards, the masseuse resisting. 4 to 8 times.

MOVEMENTS IN THE LOWER EXTREMITY

FOOT AND ANKLE

Foot Rolling: Positions.—(a) For the patient, sitting. The masseuse sits in front of, rather lower, and to the outer side of the patient. She takes the patient's foot upon her knee, allowing the heel to be over the edge. (b) The patient lying, the foot and leg supported on a firm pad, with the heel over the edge.

With the hand nearest the patient the leg is firmly held above the ankle. The outer hand holds the foot, and carries it in large circles in both directions. At the end of the rollings, the foot is strongly pressed into dorsal flexion. 6 to 12 times.

Note.—The student should bear in mind that the ankle is a hinge-joint, and this rolling can only take place as a combined movement in the ankle and tarsal joints. It is therefore incorrect to speak of ankle rolling.

Foot Flexion and Extension, or Dorsal and Plantar Flexion.—The positions are the same as for rolling. The masseuse places one hand on the dorsal surface, the other on the plantar.

Passively, the foot is carried to flexion and extension, ending with flexion and a strong pressure. 4 to 8 times.

Actively, the same movements are performed by the patient, the masseuse resisting. 4 to 8 times.

Inversion and Eversion, or Supination and Pronation of the Foot.—The positions are the same as for rolling. The masseuse grasps the patient's foot with both hands, beginning with the thumbs upon the dorsal surface, the fingers on the plantar.

Passively, she turns the outer border of the foot towards the centre, at the same time trying to increase the concavity along the inner border of the foot, which is then in the position of inversion. She then changes the holding, and allows the fingers to be on the dorsal surface, the thumbs below. She now turns the outer border of the foot out as far as possible. It is then in the position of eversion. 4 to 8 times.

Actively, the same movements are performed by the patient, the masseuse resisting. 4 to 8 times.

Active inversion with concentric and eccentric work is much used in the treatment of flat foot (see p. 141).

Knee Flexion and Extension: Position.—(a) For the patient, sitting. The masseuse sits at the side, and places her own knee under that of the patient. The masseuse places her hand nearest the patient above the knee and fixes it, with the other hand she grasps above the ankle.

Passively, the masseuse carries the lower leg to full extension, then back to flexion, pressing the limb against her own. In this way flexion can only be carried to a little less than the right angle. 4 to 8 times.

Position.—(b) For the patient, lying. The masseuse stands at the side, and with the hand nearest the patient grasps round the thigh above the knee, holding the hip flexed to a right angle.

The masseuse grasps the ankle, and alternately flexes and extends the knee to its full limit. 4 to 8 times.

Note. This position is not always satisfactory, on account of the unfixed position of the hip-joint.

Position.—(c) The patient lies prone.

The masseuse stands at the side, and alternately flexes and extends the knee. The fullest flexion can be obtained in this position. 4 to 8 times.

Active flexion and extension can be done in all the above positions, the patient performing the movement, the masseuse resisting.

Knee-Pumping.—This is the same as knee-flexion and extension in position *a*, but it is performed quickly and is always a passive movement. 8 to 20 times.

HIP-JOINT

Position.—For the patient, lying. The masseuse stands at the side.

Circumduction or Rolling.—The masseuse supports behind the knee, with the hand nearest the patient. With the opposite hand she holds the foot, grasping the heel, and letting it lie in the palm of her hand.

Part of a circle is then described with the knee. It is first carried up in a sagittal plane to the shoulder, then allowed to fall outwards in a large semicircle, and brought back to the starting-point. The knee should remain flexed throughout the rolling.¹ 6 to 18 times.

Note.—The rolling is done in an outward direction only. Some authorities hold that circles performed inwards are injurious to the pelvic organs.

The rolling may also be given in small circles round a large one. This form is chiefly used for mobility. 4 to 6 times.

The rolling may also be given in large circles, swinging the knee strongly against the shoulder. This form is chiefly used in the treatment of constipation. It exercises pressure against the abdomen, and stimulates the organs. 4 to 8 times.

Flexion and Extension.—The position and holding are the same as for rolling.

Passively, the leg is alternately flexed and extended by the masseuse, movement taking place both in the hip and knee. Considerable pressure may be exerted by the masseuse upon the leg, when it is fully flexed. 4 to 8 times.

Actively, the same movement is performed by the patient, the masseuse resisting. 4 to 8 times.

Abduction and Adduction.—The position is the same as for rolling, but the foot is supported on the couch with the knee well flexed. The masseuse places her hands one each side of the knee-joint, and passively carries the thigh to the abducted position, and back to the mid-line. 4 to 8 times.

Note.—Abduction and adduction are sometimes given both

¹ A sagittal plane is one lying parallel to a vertical line down the centre of the body.

legs together. If done actively, resistance is given alternately, on the inner and outer sides of the knees.

Rotation. The position is the same as for rolling, but the movement can be given in two ways.

(a) The patient lies with the leg fully extended. The masseuse grasps the foot with both hands, and passively turns it alternately in and out, giving some downward traction all the time. 4 to 8 times.

(b) The masseuse flexes the hip to a right angle, and holds it there by grasping round the knee with one hand. With the other she alternately turns the lower leg in and out. 4 to 8 times.

Actively, the movement is performed by the patient, the masseuse resisting. 4 to 8 times.

HEAD AND NECK

Note.—During all the following movements the masseuse gives a slight traction of the head upwards, and the patient should always be urged to keep the chin in.

Positions.—For the patient : (a) Standing or (b) sitting on a stool. The arms stretched out in front, and the hands grasping a bar or other firm support. The masseuse stands at the side. (c) Lying, the patient lies supine, having the head over the edge of the couch. The masseuse stands, sits, or kneels, and supports the patient's head with both hands.

Head Rolling (standing or sitting).—The masseuse grasps the patient's head with one hand at the border of the hair in front, with the other at the base of the skull at the back. Both hands take a wide grasp, between the thumb and index finger. Care must be taken not to drag the skin or hair. The patient must relax the muscles as much as possible. The head is carried in large circles, forward, to the right, back, left, and forward again. 4 to 12 times. This is repeated in the opposite direction.

Head Flexion Backwards and Forwards.—The masseuse takes the same holding as for rolling, except that the head is allowed to lie in the palm of the hand at the back.

Passively, the head is carried backwards and forwards. 4 to 8 times.

Actively, the patient performs the movement, the masseuse resisting. 4 to 8 times.

Head Flexion Backwards.—This is generally given actively, the patient bending the head back, the masseuse resisting, the masseuse raising it again, the patient resisting. This necessitates concentric and eccentric muscle work in the inner range. 4 to 8 times. It is used to strengthen the muscles of the back of the neck.

Head Rotation, or Head Side Turning.—The position is the same as for rolling, but the masseuse stands behind, and grasps the head in the hollows of her hands, beneath the mastoid processes.

Passively, the masseuse turns the head alternately towards the shoulders, as far as possible, and back to the mid-line. 4 to 8 times.

Actively, the patient performs the same movement, the masseuse resisting, and at the extreme turn positions the latter carries the head a little farther passively than the patient can actively. 4 to 8 times.

Head Flexion Sideways, or Head Side Bending.—The position and holding are the same as for head rotation.

Passively, the masseuse alternately flexes the head towards the shoulders and lifts it back to the mid-line. 4 to 8 times.

Actively, the patient performs the same movement, the masseuse resisting. 4 to 8 times.

Note.—Head side turning and head side bending are used concentrically and eccentrically in the inner range in the treatment of torticollis (see page 121).

The lying position is useful for giving the movements to children, especially in the treatment of congenital torticollis. The holdings vary from those already described. For rolling and head flexion backwards, the masseuse allows the head to lie in her hands. For side flexion and turning, she holds the head on either side, grasping behind the mastoid processes.

CHAPTER VII

RESPIRATION :—The respiratory forces—The uses of breathing exercises—How to teach deep breathing—Positions—Breathing exercises.

By means of respiration, oxygen, which is essential for life, is taken into the system and carbon dioxide is given off.

A full knowledge of the physiology and mechanisms of this important function is necessary, but here only a description of the muscles concerned in the respiratory movements will be given.

THE RESPIRATORY FORCES

Ordinary inspiration takes place due to the contraction of the following muscles: (a) The diaphragm. When this muscle contracts it becomes flatter to the thorax, the sides descending most. Owing to its descent, the thorax is enlarged downwards, and the abdominal walls bulge forwards, owing to the pressure on the organs. "From its attachment to the sternum and false ribs it tends to pull these down and inwards, but its action in this respect is counteracted partly by the vertical direction of the fibres attached to the ribs, and partly by the elevation of the ribs that accompanies the descent of the diaphragm" (*Thornton*). The following muscles elevate the ribs, and so enlarge the thorax from side to side, and from back to front. (b) The intercostals. (c) The scaleni. (d) The levatores costarum.

Ordinary expiration is caused by the elastic recoil of the lung tissue and costal cartilages, which have been put on the stretch during inspiration, aided by the action of abdominal muscles.

In extraordinary or forced inspiration, the following other muscles work to increase the size of the chest:

quadratus lumborum, serratus posticus superior, sternomastoid, serratus magnus and the pectoralis major and minor. The last three muscles help to lift the ribs when the arms and shoulders are fixed.

In extraordinary or forced expiration, the abdominal muscles come further into play, their action forcing the abdominal viscera and the diaphragm upwards. Triangularis sterni and serratus posticus inferior also take part.

THE USES OF BREATHING EXERCISES

The main use of breathing exercises is to enable the patient naturally to fill all parts of his lungs with air.

The result of this properly performed will be :—

(a) To maintain the natural elasticity of the lungs and mobility of the thorax.

(b) To increase the intake of oxygen and the giving off of carbon dioxide.

(c) To improve the circulation, on account of the increased supply of oxygen.

(d) By increased action of the diaphragm to give additional pressure upon the abdominal organs, and so improve their functions.

HOW TO TEACH DEEP BREATHING

The patient must be told to breathe in slowly with the mouth closed. If the thorax is freely movable, the ribs will expand, and the patient must aim at getting this free expansion. When as much air as possible is taken in, expiration should at once begin, and the air be allowed to pass slowly out again. The breath should not be held at all at the end of inspiration, and plenty of time should be given for expiration.

Muller says: "A good full inhalation depends on a good deep exhalation, but the opposite relation does not exist. If one has taken a very long and deep exhalation, one is bound to follow with a full inhalation, otherwise there results a sensation of being smothered."

Inspiration should always take place with the mouth

closed. The nasal cavities are so constructed that the air during its passage through them is warmed ; also, owing to the mucous membrane, and the presence of small hairs, particles of dust are arrested, and only the air passes to the trachea and bronchi. If the air passes in through the mouth it is cold, and probably loaded with impure particles, which pass to the lungs. The importance of this should be specially remembered if the tonsils have been removed by operation.

When teaching breathing exercises, it is often well to allow the patient (specially children) to part the lips during expiration ; by so doing the masseuse can tell how much air is passing in and out. But as soon as the lungs can be well filled, expiration should also take place with the mouth closed. Deep-breathing exercises should always be done in the best air available. In the summer, and if circumstances permit, they may be performed out-of-doors. Otherwise the patient should be near an open window.

The deep breathing is the most beneficial when combined with active movements. It should always form a part of the treatment of scoliosis, constipation, and many other conditions. Raising the arms in various ways is a help to inspiration, and deep breathing is often given in combination with certain trunk movements.

Before and after general and abdominal massage, 6 to 10 deep breathings may be done with great benefit.

It is the duty of the masseuse to see that the patient is suitably clothed during the performance of the exercises. Stays must never be worn, and all garments should be loose though warm.

In some cases it is necessary to distinguish between costal and abdominal breathing. In deep abdominal inspiration, the bases of the lungs are expanded more than the apices ; in a full costal inspiration, the upper regions of the lungs are more fully expanded.

Children and others should be encouraged to shut their mouths. The mouth may be kept open both during day and night on account of some nasal obstruction, but it is often only a habit which can be overcome by perseverance. A certain

George Catlin some forty years ago had the opportunity of studying the habits of Indian tribes in North and South America. He noticed that these people always breathed through their noses, and on inquiry found the Indian mothers were in the habit of closing their children's lips when the latter were asleep. Convinced of the importance of this habit, George Catlin wrote a book called *Shut your Mouth and Save your Life*.

BREATHING EXERCISES

Lying, with arms close to sides, with hands in supination. Deep breathing. 4 to 10 times.

Lying, deep breathing, with arm-raising sideways to shoulder height. Inspiration while raising arms, expiration while sinking them. 4 to 10 times.

Lying, deep breathing with arm-raising forwards and upwards. Keep the arms shoulder width apart. Inspiration while raising forwards and upwards, expiration while sinking to starting position. 4 to 10 times.

Lying, deep breathing with arm-raising forwards, upwards, outwards, and downwards. Inspiration during forwards and upwards raising. Expiration during sinking outwards and downwards. 3 to 6 times.

Note.—These may also be given in the standing position. It is unsuitable to give all the above series consecutively. The form of breathing exercises used must depend on the age and condition of the patient.

Half-lying, Chest Lift Stroking.—The patient must be placed midway between the sitting and lying positions. The exercise is given on a Swedish plinth, on a couch or in bed. If the latter, the patient is supported on pillows.

The masseuse places her hands one each side, under the patient, at the level of the scapulæ. She tells the patient to breathe in, and at the same time lifts the thorax, and draws her hands downwards and forwards, round to the front. The patient is then ready for expiration, which is done while the masseuse gives slight pressure with each hand in the front and lower part of the thorax.

This exercise helps both inspiration and expiration. It

can be given to weak patients, and is the most suitable breathing exercise to give in bed. 4 to 6 times.

Sitting, Chest Lifting.—The patient sits on a stool, the arms hanging down at the sides. The masseuse stands behind, and supports the patient's back with her hip, placing a firm cushion between. She puts her hands in front, into the patient's axillæ, and lifts up the shoulders as she tells the patient to breathe in. At the same time the shoulders are drawn back, to give a slight chest expansion. The patient is then told to breathe out. The masseuse relaxes her hold, and allows the chest wall to sink back to the starting position. She does not, however, remove her hands, and when expiration is complete the whole process is repeated.

This is useful between strong active movements. It is mainly an aid to inspiration. 6 to 8 times.

Note.—Deep breathings will be mentioned again later, combined with arm and trunk movements.

CHAPTER VIII

SOME GENERAL EXERCISES :—Rules for giving exercises—Order for giving exercises—Positions—Arm exercises—Leg exercises—Trunk exercises—Sacral beating—Chest clapping.

A FULL account of Medical Gymnastic Exercises is not within the scope of this book. Exercises are however used so much as an adjunct to massage that it is necessary to give a short account of some. Those requiring gymnastic apparatus will not be described.

The exercises may be :—

Free, i.e. active movements performed by the patient alone.

Resisted, i.e. active movements performed by the patient, and made stronger by the resistance of the masseuse.

The passive and active movements as described in a previous chapter may be used in combination with these. The general effects of active movements have already been given. Any special effects will be mentioned with each exercise.

RULES FOR GIVING EXERCISES

The patient's starting position should be comfortable and must be correctly maintained throughout.

Both patient and masseuse should breathe freely. Special directions are given when deep breathing is to be done.

The strength of the exercises, the number given, the time each one is performed, and the resistance applied must vary according to the condition and age of the patient.

As a rule exercises should be chosen to influence all parts of the body in turn. Those for special conditions must be placed suitably among the others.

The patient must not be over-tired, and should always rest for a stated time after treatment.

Similar exercises should not immediately follow each other, and the strongest movements should be in the middle of the treatment.

The exercises should be arranged for the various parts of the body in the following order :—

Breathing.
Arms.
Legs.
A passive trunk movement.
Head and neck (sometimes omitted).
Abdomen.
Back.
Arms.
Legs.
Breathing.

Extra breathing exercises are given besides those mentioned above.

Passive stretching of the spine by hanging should be immediately followed by an active exercise for the back muscles.

POSITIONS

Standing.—The heels together, toes turned slightly out. The knees and hips stretched and straight. The spine fully stretched, the shoulders carried back and down. The head erect, the chin drawn in. The arms hanging down each side, with the elbows, wrists, and fingers fully stretched. The abdominal muscles are slightly drawn in, and the anterior curve in the lumbar spine must not be accentuated.

When the standing position is indicated, all the above points must be carefully maintained. This position is much used.

Sitting.—The patient sits on a stool. The feet rest on the floor, with heels together. The position of the head, shoulders, and arms is the same as described for standing.

This position is a steady one, and more restful than standing.

Lying.—The patient lies flat on his back. This position is the same as standing, except that the body is horizontal instead of vertical, and it is supported from head to heels. The position is steadier than either of the former, and is much used for children and weak patients.

Hanging.—The patient grasps a bar with the hands shoulder width apart.* The feet are off the ground. The head must be carried backwards.

Hanging is used as part of the treatment of curvature of the spine. In a table of exercises for such patients it should occur 2 or 3 times. The length of the hangings depends on the age and condition of the patient. A strong patient may hang from a quarter to half a minute, 3 or 4 times consecutively. Deep breathing should be performed six times between each hanging. It is done between active and other exercises. For young and weak patients the hanging must be more limited.

ARM EXERCISES

Arm Bend Standing, Arm Extension Upwards, Outwards, and Downwards.—A free exercise. Standing, hands are placed on the shoulders, elbows kept close to the sides.

1. Arms are extended upwards, elbows, wrists, and fingers fully stretched, arms kept shoulder width apart.

2. Hands brought back to starting position on the shoulders.

3. Arms are extended outwards to the horizontal position, level with the shoulders, and palms turned downwards.

4. Hands brought back to starting position.

5. Arms are extended down to the sides.

6. Hands brought back to the starting position.

The exercise should be done vigorously, and the masseuse or patient should count throughout as given above. Repeat 4 to 8 times.

Use.—For strong patients. It exercises the arm muscles, expands the chest, and improves the general holding.

Swim Standing, Arm Casting.—A free exercise. Standing, the hands are placed across the chest, palms downwards, and finger-tips touching.

1. The arms are thrown briskly out sideways, but kept level with the shoulders. The patient should feel the scapulae approaching each other. The head must maintain a good position.

2. The arms are carried back to the starting position. Repeat 6 to 18 times.

Use. Exercises the arm muscles, and expands the chest. Good for patients with round shoulders.

*Yard*¹ *Standing, Double Arm Rolling.* A free exercise. Standing, the arms are extended sideways, and kept horizontal with the shoulders. They are then carried in small circles (movement in the shoulder-joints) first in one direction, then the other. Repeat 6 to 12 times each way.

Use.—Increases circulation and chest expansion.

Shoulder-blade Exercise.—A free exercise. Standing, hands are clasped behind.

1. The hands are drawn sharply up to the waist.

2. The hands are fully extended. Repeat 8 to 20 times.

Care must be taken that the anterior curve in the lumbar region is not increased. If this seems to be the case an exercise carrying the trunk in the opposite direction must follow, *e.g.* downwards and forwards bending.

Use.—It expands the chest, and corrects the position of the shoulders.

Sawing.—A free exercise. The patient stands with feet wide apart to give a steady base. The hands are clenched, the elbows flexed, and the forearms drawn up.

The arms are thrust alternately forwards (counting 1! 2!) and back. At the same time the spine is rotated from side to side, the shoulders being brought alternately forward with each movement. The body is gradually bent forwards till the hands almost touch the ground. The arm movement is continued, while the body is raised to the starting position.

Repeat the arm movement 6 to 8 times during the bending, and the bending 3 to 4 times.

Use.—Strengthens the arm and back muscles. Increases mobility of the spine. Stretches the spine in the lumbar region.

¹ Yard denotes the outstretched position of the arms.

Hewing.—A free exercise. The patient stands with feet wide apart, the hands clasped in front. The arms are raised over the head, and carried (1!) down in a swinging movement, the whole trunk bending forwards and downwards (2!), the body is raised to the starting position. Repeat 4 to 8 times.

Use.—Helps the circulation. Increases mobility of the spine. Strengthens the back muscles. Stretches the lumbar spine.

Double Arm Flexion and Extension.—An active resisted exercise.

Position (a).—Lying. The patient lies upon a firm couch, and stretches up the arms. The masseuse stands at the patient's head, and grasps her hands, with the thumb grasp.¹

The patient slowly flexes and extends both arms together: in flexion, drawing the elbows close to the sides; in extension, fully stretching the elbows and keeping the arms shoulder width apart. The masseuse gives steady resistance throughout. For each movement she says "bend" for flexion, and "stretch" for extension. The masseuse gives an overstretching when the arms are extended, and slightly presses the elbows to the sides during full flexion. The patient must keep the elbows close to the couch throughout the movement. The lumbar spine must not be arched forwards.

Muscles of the arms, shoulders, and some of the back work during the exercise. All groups work concentrically.

Deep breathing may be added, inspiration during extension, expiration during flexion. The movements are then performed more quickly. Repeat 5 to 10 times.

Use.—Strengthens the working muscles, and helps respiration.

Position (b).—Sitting. The patient sits on a stool, and stretches up the arms as in lying. The masseuse stands on another stool behind the patient. The hands are grasped as before. The masseuse supports the patient's back with her knee and leg, a firm cushion between. The head must

¹ The thumb grasp.—The masseuse grasps round the patient's thumb with her whole hand; the patient's hand closes over the masseuse's.

not be pushed forwards. The movement is then performed as in lying.

Use.—The same as lying, but harder, as the patient must maintain the sitting position.

Double Plane Arm Carrying.—An active resisted exercise. It may be done in various positions.

Position (a).—*Yard Fall Standing.*—The patient stands with back supported vertically against a pole or other support, *e.g.* the corner of a wardrobe. The arms are outstretched horizontally with the shoulders, the palms facing forwards. The masseuse stands in front and lightly grasps the patient's wrists (either from above or below, according to the height of the patient). The patient resists, while the masseuse draws the arms forward till they are shoulder width apart. The patient then carries the arms back to the starting position, while the masseuse resists. The following muscles are acting:—The back part of deltoid, trapezius, the rhomboids, and latissimus dorsi. These work eccentrically during the first part when the patient resists, concentrically during the second part when the masseuse resists. The triceps are working statically to keep the arms extended.

Position (b).—*Yard Walk Standing.*—The patient stands with one foot placed forwards about two foot lengths. The masseuse stands in front, and takes a similar position, so that the side of her foot touches the patient's and gives support. The exercise is then performed as above. This position is less steady than fall standing. The extensors of the spine are acting statically to maintain the position.

Position (c).—*Yard Stride Stoop Sitting.*—The patient sits on a stool, with arms outstretched and the knees parted. The body leans forward from the hip-joints, but the back is kept quite flat. The masseuse stands in front of the patient, and the exercise is performed as before. This position is steadier than the others, but it is harder to do, because the back muscles have more work in maintaining the stoop position.

Use.—It strengthens all the working muscles, and corrects round shoulders.

Neck Firm Sitting, Chest Expansion.—A passive exercise. The patient sits on a stool, and places the palms of her hands at the back of the neck, the finger-tips touching. The masseuse stands behind, and places a firm cushion between herself and the patient's shoulders. She places her hands over the patient's elbows, and gradually draws them slightly up and back, as far as can be borne. Repeat 5 to 10 times.

Use.—Stretches the pectoral muscles, and expands the chest.

LEG EXERCISES

Leg Swinging.—A free exercise. The patient stands with one arm outstretched sideways, and grasps a bar. The opposite hand is placed on the hip. The patient stands on the edge of a low platform or on the floor. The leg swings on the same side as the grasping hand, backwards and forwards as far as possible. The knee is kept straight, and all movement comes from the hip. The body must be kept erect. Repeat 10 to 15 times. The patient turns round, grasps the bar with the other hand, and swings the other leg.

Use.—For mobility and circulation.

Hips Firm Standing, Alternate Knee Raising.—A free exercise. The patient stands with heels together and toes turned slightly out. The hands are placed on the hips, keeping the elbows in a line with the body. The knees are raised alternately as high as possible, keeping the lower leg straight and the toe pointing to the floor, in the following order:—

1. Raise the right knee.
2. Replace the right foot.
3. Raise the left knee.
4. Replace the left foot.

Repeat 6 to 12 times.

Use.—Strengthens the working muscles, viz. flexors of the hip. A good balance exercise. When the knee is brought up sharply against the abdomen it is stimulating to the internal organs and may be used in the treatment of constipation.

Hips Firm Standing, Alternate Knee Raising with Leg Extension. A free exercise. The first part of this exercise is the same as the former, but after the knee has been raised the lower leg is extended. It is performed in the following order :—

1. Raise the right knee.
2. Extend the lower leg.
3. Bend the knee as before.
4. Replace the foot on the floor.
5. Raise the left knee.
6. Extend the lower leg.
7. Bend the knee as before.
8. Replace the foot on the floor.

Repeat 4 to 8 times.

Use.—The same as the former, but a harder balance movement, and more muscles come into work, viz. the extensors of the knee and foot.

Grasp Lying, Single Leg Lifting.—A free exercise. The patient lies on a couch, and grasps the corners, or on the floor and grasps a support.

1. The right leg is slowly raised, till it is at right angles with the body ; the knee is kept fully extended.
2. The leg is slowly replaced on the couch, and the knee still kept extended during the sinking.
3. The left leg is raised in the same way.
4. The left leg is replaced in the same way. Repeat 3 to 6 times.

The patient must breathe freely during the exercise.

During the lifting flexors of the hip work concentrically, and extensors of the knee statically. During the sinking flexors of the hip and extensors of the knee work eccentrically to prevent the whole limb falling by its own weight.

Use. Strengthens the working muscles and is good for co-ordination of movement.

Grasp Lying, Double Leg Lifting.—A free exercise. This is the same as the former, but both legs are lifted together. The sinking should be done very slowly.

The muscle work is the same, except that abdominal

muscles come into play, and work statically. Repeat 3 to 6 times.

Use.—The same as above, but when given double it may be used as an abdominal exercise. If the legs are carried over the head, it stretches the lumbar spine and corrects lordosis.

Grasp Lying, Double Leg Flexion.—An active resisted exercise. The patient lies on a couch and grasps the corners. The masseuse stands at the feet and grasps above the patient's ankles.

The patient flexes the hips and knees while the masseuse resists. The knees are well parted, and the masseuse increases the flexion with slight pressure. The patient then resists, while the masseuse draws the legs back to the starting position. Repeat 3 to 6 times.

During flexion, the flexors of the hips and the knees work concentrically, during resistance they work eccentrically. The abdominal muscles, chiefly rectus, works statically.

Use.—Strengthens the working muscles. It draws blood to the abdomen and pelvis. It stretches the lumbar spine, and corrects lordosis.

Hips Firm Standing, Heel Raising and Knee Bending.—A free exercise. Sometimes the patient requires support, when a bar may be grasped during the movement.

1. The patient rises on tip-toes.
2. The knees are well parted and slowly flexed. (The back must be kept straight.)
3. The patient again rises on to tip-toes.
4. The heels sink down to the floor. Repeat 4 to 8 times.

Muscle work: During 1—The calf muscles concentrically, the back muscles and extensors of the knees statically. During 2—The extensors of the knees eccentrically, to prevent the body sinking down by its own weight. During 3—The extensors of the knees strongly concentrically, also the calf muscles concentrically. During 4—The calf muscles eccentrically.

Use.—Specially strengthens extensors of the knees. A good balance movement.

Balance Walking.—A free exercise. This may be done on

a specially designed bar; but if this is unavailable, 4 or 5 yards of bandage may be placed on the floor in a straight line. The patient stands at one end with arms outstretched or hands on the hips, and in time with counting walks slowly along the bandage. Repeat 3 to 6 times.

Use.—To improve co-ordination of movement in patients suffering from certain nervous diseases, also in the treatment of scoliosis, when the spine should be corrected as far as possible immediately before the walking.

FREE EXERCISES FOR FLAT FOOT

These should be performed by the patient twice daily in addition to massage and movements described in the chapter on flat foot. Shoes must not be worn. The body and head must be kept erect throughout. The hands grasp a bar or are placed on the hips.

1. The feet placed parallel, one foot apart. (1) Rise slowly on to tip-toes. (2) Return to starting position. Repeat 12 times.

2. Invert the toes. Repeat the raising and sinking. 12 times.

3. Feet parallel. (1) Rise on the toes. (2) Rise on the heels. 12 times.

4. Feet parallel. (1) Rise on to the outer borders of the feet. (2) Return to starting position. 12 times.

5. Feet parallel. Heel raising and knee bending, as described in former exercise. 12 times.

6. Hands on hips, feet parallel. Rise on to tip-toes, march slowly twelve steps. Repeat 4 times.

7. Hands on hips, toes inverted. March twelve steps. 4 times.

8. Stand with the feet over the edge of a platform or step, at the level of the tarso-metatarsal joints. Bend the toes and foot down to the floor as far as possible and rise again. Repeat 12 to 18 times.

9. To be done in shoes. Hands on hips. Feet parallel. (1) Rise on toes. (2) Turn the heels sharply out. (3) Replace (right) foot on the floor. (4) Replace (left) foot on the floor. Repeat 8 to 12 times.

TRUNK EXERCISES

Wing Stride Standing, Trunk Rolling.—A free exercise. The hands are placed on the hips, and the feet parted a distance of 2 feet. A good position of the trunk and head must be maintained, and the knees kept fully extended. The trunk is then carried in large circles in the following directions :—

(a) Forwards, right, back, left, forwards. Repeat 6 to 8 times. Raise to starting position.

(b) Forwards, left, back, right, forwards. Repeat 6 to 8 times. Raise to starting position.

If there is any tendency to lordosis, the flexion backwards should be limited, in the forwards direction it should be carried as far as possible.

Use.—Increases mobility in the spine. Stimulates the digestive tract, and increases peristalsis. Improves the general circulation, and that within the portal system.

Wing Stride Standing, Trunk Bending Forwards and Raising.—A free exercise. The hands are placed on the hips, and the feet parted a distance of 2 feet. The back is kept flat, movement taking place in the hip-joints.

1. The trunk bends forward slowly, as far as possible, keeping the knees in full extension.

2. The trunk is raised to the starting position. During the flexion forwards, extensors of the hip work eccentrically, the back muscles statically. During the raising, extensors of the hip work concentrically, the back muscles statically. Repeat 3 to 6 times.

Use.—It strengthens the working muscles, and improves the general holding of the body.

Stretch Stride Standing, Forwards and Downwards Bending.—A free exercise. The arms are fully extended upwards, and kept shoulder width apart. The feet parted a distance of 2 feet.

1. The whole trunk is carried slowly forwards and downwards to the floor. The knees are kept extended throughout, but the back is rounded. The patient tries to touch the floor with the fingers.

2. The trunk is raised to the starting position. Repeat 3 to 6 times.

The body weight carries the trunk forwards. During the raising, the extensors of the hip and back work concentrically, the extensors of the arms statically.

Deep breathing may be added to this exercise; expiration taking place during the forward bending.

Use.—Strengthens the working muscles, specially those which extend the spine. Improves respiration.

Close Standing, Alternate Trunk Side Bending.—The feet are placed with their inner borders touching. The arms hang down. The head must maintain a good position. The trunk is laterally flexed to each side. The exercise is usually performed with deep breathing as follows:—

1. In starting position. Breathe in.
2. Bend to the right as far as possible (the bending should be purely lateral, no twisting), and breathe out.
3. Raise to starting position, and breathe in.
4. In starting position, breathe out.

Repeat the series to the left. Repeat 4 to 6 times.

Use.—The lateral flexion stretches the soft parts on the side of the thorax away from the bending, and stretches adhesions in the pleura if present. During flexion more space is given to the lung for expansion on the side away from the bending. If pleural adhesions are present, extra flexions should be given away from the side where they exist.

Wide Close Standing, Alternate Trunk Side Turning.—A free exercise. The hands are placed on the hips, the inner borders of the feet close together.

1. Turn trunk to right as far as possible.
2. Return to starting position.
3. Turn trunk to left as far as possible.
4. Return to starting position. Repeat 6 to 10 times.

The face must be kept in a line with the centre of the body.

The patient should be instructed to draw in the abdominal muscles during the movement. Deep breathing may be added; expiration taking place during the forward turning. The muscles which rotate the trunk are working concentrically throughout.

Use.—It strengthens the working muscles, and is especially used for lax abdominal walls. It also increases peristalsis and mobility of the spine.

Wing Close Sitting, Alternate Trunk Side Turning.—An active resisted exercise. The patient sits on a stool, with hands on hips, and inner borders of feet touching. The masseuse stands in front, and fixes the patient's knees with her own, one each side. The turning is done in three ways.

1. The masseuse places her left hand behind the patient's right shoulder, and her right hand in front of the left shoulder. She passively carries the patient's trunk to the left turn position as far as possible. The patient then turns the trunk to the starting position.

The masseuse reverses her holding—viz. left hand in front of right shoulder, and right hand behind left shoulder. The turning is repeated to the right. 3 to 6 times.

The first part of the movement is passive, the second part is active concentric work for the rotators of the trunk, viz. the oblique abdominal muscles, and fibres of certain back muscles lying in an oblique direction.

2. The same holding is taken by the masseuse. She turns the patient alternately to right and left, the patient resisting; from each turning the patient returns to the starting position, the masseuse resisting. Repeat 3 to 6 times.

The same muscles are working as in No. 1, but in the first part they work eccentrically and in the second concentrically. This form is somewhat harder than the first.

3. The masseuse passively carries the patient's trunk to the extreme left turn position; her right hand on the front of the left shoulder, her left hand behind the right shoulder. The patient then turns front, and round to the right, while the masseuse resists. Here the masseuse reverses her holding, and the movement is repeated to the left.

All the muscles rotating the trunk work concentrically. This is harder than the two previous forms. Repeat 3 to 6 times.

Use.—All the turnings strengthen the working muscles. Specially used for weak abdominal walls, and to increase peristaltic action.

Wing Sit-lying, Raising and Sinking.—A free exercise (except that the knees are fixed). The patient places hands on hips, sits upon the end of a couch, and then lies down, keeping the knees flexed and the feet upon the floor. The masseuse stands in front and firmly fixes the knees.

The patient raises her trunk to the sitting position, slightly arching the back, and allowing the head to leave the couch last. Then she slowly sinks back to the starting position, allowing the head to touch the couch first.

Deep breathing may be added, expiration always taking place as the trunk is carried forward. Repeat 3 to 8 times.

During the raising the flexors of the hip work concentrically, the abdominal and back muscles statically. During the sinking, the flexors of the hip work eccentrically, the abdominal and back muscles statically.

Use.—It draws blood strongly to the abdomen and pelvis. It strengthens the working muscles. It is much used for a strong patient in the treatment of constipation.

Wing Stride Sitting, Back Raising.—An active resisted exercise. The patient sits on a stool, hands on the hips, and knees and feet parted. The masseuse stands behind and places her hands over the patient's scapulæ. The patient bends forward as far as possible, rounding the back. She then raises to the starting position, while the masseuse resists. The lumbar part of the spine must first be extended, next the dorsal, finally the cervical, when the shoulders must be well drawn back, and a good position of the head maintained. The corrected position should be held for a few seconds. Repeat 4 to 8 times.

The first part of the exercise, viz. bending forwards, is passive. During the raising, all the extensors of the spine and the back shoulder muscles work concentrically. During the holding in the corrected position they work statically.

Use.—Strengthens the spinal muscles.

Wing Leg Forward Lying, Holding.—An active exercise. The patient kneels upon a firm table or high couch. The distance from the hips to knees and from the knees to the edge of the table must be equal. The masseuse stands in front and gives support in both axillæ. The patient places her

hands on the masseuse's shoulders. The legs must be firmly fixed by a cushion and strap above the ankles, or held down by another person. The patient then flexes her hips and gradually falls forward, until her trunk lies horizontal. She places her hands on the hips, and the masseuse no longer supports. The body is now extended beyond the edge of the table, and the patient remains thus for as long as possible. The back should be uncovered, so that the masseuse sees that the spine is as straight as possible. The head must maintain a good position. When the patient shows signs of fatigue she is told to replace her hands on the masseuse's shoulders, she springs up at the same instant that the masseuse lifts with her hands in the axillæ. Repeat 2 to 4 times. Deep breathing between.

During the holding, the back muscles work statically. If the position is taken incorrectly it is liable to produce lordosis.

Use.—Strengthens all the back muscles.

Long Sitting, Touch Toes.—A free active exercise. The patient sits on a couch or the floor with the legs outstretched in front, the knees fully extended. By small movements forward she tries to touch her toes with her fingers. Repeat 4 to 10 times.

Use.—Stretches the lumbar spine and the hamstring muscles, and so corrects lordosis.

Crook Sitting, Holding.—A passive stretching. The patient sits on the floor, her back against some support. The knees are drawn up close to the abdomen, the feet remain on the floor. A strap is placed round the support and the patient above the ankle-joints, and firmly fixed. A firm cushion is placed between the support and the patient's shoulders, the arms are stretched up and grasp a bar.¹ The patient remains in this position for from 1 to 5 minutes.

Use.—It stretches the muscles and ligaments in the lumbar region. It expands the chest, and corrects the position of the shoulders. Is used in the treatment of kyphosis and lordosis.

¹ This holding is the most satisfactory if Swedish apparatus is available. But the end of a bed, where the bars come low down, may be used as a substitute.

General Corrective Position.—A holding. The patient stands with the spine against a vertical support, e.g. the corner of a wardrobe. The feet are slightly parted, and placed from 4 to 8 inches from the support. For taking the position the spine touches the support in the following order—sacrum, lumbar and dorsal regions, lastly the head. The abdominal muscles must be drawn in and made to work statically. By degrees the feet are drawn nearer the support, but the spine must always touch throughout its length. It is difficult to maintain this in the lumbar region.

The patient maintains the position for from 1 to 5 minutes.

Use.—It corrects lordosis, and improves the whole bearing of the body.

Sacral Beating.—A passive exercise. The patient stands leaning slightly forwards upon some support, the toes turned in. The masseuse stands on the left side, and places her left hand over the patient's abdomen. With the right she performs a series of beatings in the sacral and gluteal regions, in the following order :—

On the right, a row of 7, beginning over the sacrum, and extending down over the gluteal region. Repeat on the left.

On the right, another row of 7, performed a little nearer the centre. Repeat on the left.

On the right a row of 5, performed nearer the centre, and in an upwards direction. Repeat on the left.

The whole series is repeated 2 to 4 times. Deep strokings done with both hands are afterwards given over the gluteal areas.

The beating is always done through some garments, but stays should never be worn. The muscles round the anus are said to be more relaxed when the toes are turned in. The patient must not contract the gluteal muscles during the beating.

Use.—It gives a mechanical stimulation to the abdominal organs, and increases peristalsis; is much used in the treatment of constipation.

Chest Clapping.—A passive exercise. The patient stands with hands behind the neck, and one foot placed forwards.

The masseuse stands in front, and places her foot beside the patient's, and thus gives a little support.

The masseuse places one hand each side of the patient's back, and begins the clapping high up, gradually working to the lower part. The sides of the thorax are then covered, and the hands still clapping are brought round to the front. No clapping is done below the ribs. Light hacking is given up the sternum and a little light hacking or clapping upon the upper part of the chest in front. The hands are then carried round to the back again, and the whole series is repeated 3 to 4 times. The clapping should be immediately followed by deep breathing. 4 to 8 times.

For weak or elderly patients, the clapping may be given with the patient sitting leaning over a support. The masseuse then stands at the side and gives the clapping in much the same way as during back massage, but the whole thorax must be covered. When the chest is treated, the patient may sit back in an armchair.

Use.—It stimulates and strengthens the thoracic organs, and helps the exchange of gases in the lungs. It helps expectoration, and is used for those lung diseases which are suitable for gymnastic treatment, viz. chronic bronchitis, and during the after-treatment of adenoids, pleurisy, and pneumonia.

PART II

SURGICAL CONDITIONS TREATED BY MASSAGE, WITH DETAILS OF APPLICATION

CHAPTER IX

INFLAMMATION :—Causes—The natural process of repair—The process of inflammation—The terminations—Suppuration. **THE HEALING OF WOUNDS** :—By first intention—By second intention or granulation—Scar tissue—Tubercular inflammation of bone—Tuberculous disease of the spine.

“INFLAMMATION is the succession of changes which occur in a living tissue when it is injured, providing the injury is not of such a degree as to at once destroy its structure and vitality” (*Burdon Sanderson*).

The following are some of the causes :—

(a) Direct violence, *e.g.* a blow ; (b) changes of temperature, *e.g.* excessive heat causing burns of the skin, intense cold resulting in frost bite ; (c) electricity, *e.g.* lightning or injudicious X-rays ; (d) bacteria ; (e) chemical irritants.

Inflammation is the natural process of repair of living tissues, and must be distinguished from suppuration, which is a complication, and will be explained later.

The signs of inflammation which can be seen and felt or described by the patient are : —pain, swelling, redness, heat, and loss of or impaired function. These are known as the clinical signs.

The process of inflammation is usually divided into two stages : (a) hyperæmia ; (b) exudation.

Hyperæmia, *i.e.* an extra supply of blood to the part. To begin with, the blood-vessels dilate, first the arteries, then the capillaries, and then the veins. While dilatation of the blood-vessels is going on, the blood-stream increases in speed. So there is a condition of dilatation and quickened flow. Along with these changes, come two of the clinical signs

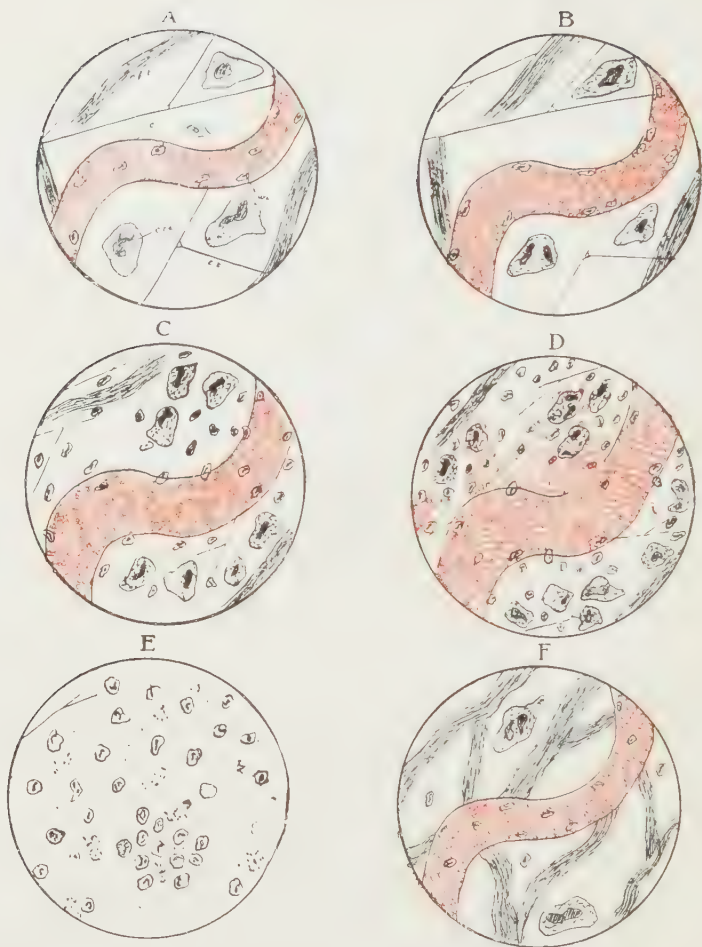


FIG. 21.—DIAGRAM OF CHANGES IN THE BLOOD-VESSELS AND TISSUES DUE TO INFLAMMATION.

A. Normal capillary blood-vessel and connective tissue: *ft*, fibrous tissue; *ctc*, connective cell; *wc*, white blood corpuscle; *c*, capillary; *et*, elastic tissue.

B. First change. Dilatation and congestion of blood-vessel; the white cells arranged along the sides of the vessel wall; exudation of serum.

C. Second change. Blood-vessel, dilated and congested; exudation of white cells (phagocytes); multiplication of fixed connective-tissue cells; fibrous and elastic tissue indistinct.

D. Third change. Rupture of the congested vessel and escape of red corpuscles; multiplication of connective-tissue cells; normal tissue very indistinct.

E. Pus. Breaking down of the whole tissue, due to the presence of micro-organisms; suppuration.

F. Chronic inflammation. Blood-vessel small; great increase of fibrous tissue.

From Howard's "Surgical Nursing," by permission of Mr. E. Arnold.

mentioned above, viz. redness and increased heat. The inflamed part feels hotter because a greater amount of blood passes through it in a given time.

As the inflammation increases, the blood-stream next becomes slower ; it slackens first in the veins, then in capillaries, and then in the arteries. Finally it stops, and there is a condition known as *stasis*. There is still dilatation of the blood-vessels. Sometimes the dilatation is so extreme that the vessels burst.

Exudation, i.e. an oozing out of fluid. While the above changes are occurring, the fluid part of the blood, known as liquor sanguinis or plasma, is oozing through the vessel walls into the surrounding tissues, causing a swelling or oedema of the part. This is a third clinical sign. The swelling will cause a stretching of the skin and pressure on the nerves, giving rise to pain, a fourth clinical sign. This exuded fluid is called inflammatory lymph. It is not the same as that within the lymphatic vessels. It is only found when a part is inflamed.

Together with the exudation of plasma there is migration of white blood corpuscles from the vessels into the surrounding tissues. The white corpuscles are continually changing their shape. They send out minute processes called pseudopodia, and by means of these they push their way through the vessel walls. They then wander about the inflamed area, and are known as phagocytes. If the inflammation is very severe, red corpuscles may also be exuded.

The inflammation has now reached its height, and the following conditions are present :—

1. Dilated and sometimes ruptured blood-vessels.
2. A slow blood-stream or stasis, which takes place first in the veins.
3. Exuded inflammatory lymph.
4. Multiplication of connective-tissue cells.

The clinical signs will still be present, and the patient will also show general symptoms as a result of the inflammation. There will be a rise of temperature, 99° F. to 101° F. A general feeling of discomfort combined with headache and loss of appetite.

THE TERMINATIONS OF INFLAMMATION

These may take place in one of the following ways, according to the severity of the original injury.

1. *Resolution*.—The cause of the inflammation is removed and the tissues return to their normal condition. To attain this end the following changes take place:—

(a) The inflammatory lymph is absorbed by the blood or lymph-vessels.

(b) The white blood cells mainly return to the blood-stream or are carried away by the lymphatics. Some of them die.

(c) The red cells die and disintegrate. Their colouring matter is shown in parts which have been inflamed.

(d) New cells take the place of old ones.

2. *Chronic Inflammation*.—The blood-vessels remain dilated for a longer time. The lymph is still poured out, new cells are being continually formed. This gives rise to overgrowth of fibrous tissue, and function of the part is impaired. It also may remain swollen, hot, and painful.

3. *Suppuration*.—This condition is always caused by the presence of micro-organisms.

Such micro-organisms are pyogenic or pus-forming. By their growth they have the power of liquefying the tissues, and causing the white blood cells to die. The cells of the inflamed tissues die too, and so the whole area becomes filled with a liquid which is called pus, in which float dead cells. The pus will continue to form so long as the micro-organisms are living, and in the case of an abscess until it can reach the surface, when it bursts and discharges its contents. If this does not occur, it is often necessary for the abscess to be opened by the surgeon.

THE HEALING OF WOUNDS

“A wound is the solution of continuity of any tissues of the body, in which the skin participates. If there be no solution in continuity of the skin, but the deep tissues are lacerated, there is a contusion or bruise” (*Howard*).

It is now necessary to explain how inflammation takes part in the natural process of the healing of a wound.

Wounds heal in two ways: (a) by first intention; (b) by second intention or granulation. Under the second heading must be mentioned healing under a scab or blood-clot.

Healing by First Intention.—This takes place when a wound is in an aseptic condition. Inflammatory lymph is poured out, binding the edges of the wound together. Multiplication of connective-tissue cells occurs, and new capillary loops are formed from the sides of the wound, which branch and spread among the new connective-tissue cells. These cells together with the capillary loops form granulation tissue within the wound. The cells increase in number; they stretch across the sides of the wound, uniting them, and by degrees they contract somewhat, causing the edges of the wound to be drawn closer and closer together. The new capillaries become nipped, and finally they disappear.

Healing by Second Intention or Granulation.—This takes place when it is impossible to draw the edges of a wound together, when its condition is not aseptic, or if the wound is kept open by extravasated blood.

In any of these conditions much fluid is discharged upon the surface. If the wound is aseptic the fluid is inflammatory lymph. If it is septic it is pus.

The same formation of granulation tissue takes place as is described in healing by first intention. The granulation tissue eventually fills up the wound, and in time epithelium grows over it. These granulations become fibrous, and form scar tissue.

“A scar is a mass of fibroid tissue covered by epithelium which has been formed in the repair of a wound. It is at first vascular, and contains cells of the connective-tissue type; but after a time, as contraction continues, the cell elements become flattened out, fewer in number and less obvious, the intercellular fibrous tissue more abundant, and the vessels constricted, so that finally a scar becomes well-nigh bloodless. Where superficial its colour changes from red to white, and if of small size it may almost disappear, but never absolutely, unless the subcutaneous tissue has not been involved. Lymphatics, nerves, hairs, and cutaneous glands are all absent in scar tissue” (*Rose and Carless*).

Large areas of skin are affected by scar tissue as the result of burns, shrapnel wounds, and as the result of sepsis.

Massage is often ordered for such cases. Oil should be used as a lubricant. Frictions are the only manipulations possible, but these may be of great benefit; and if the affected areas are near a joint, passive movements may be given to improve mobility and stretch contractions in the skin.

TUBERCULAR INFLAMMATION OF BONE

Every masseuse in the course of her work will come across patients suffering from tuberculosis in various forms. Such cases are not treated by massage when the disease is active, but it is important to have some knowledge of the complaint. Any part or organ of the body may be affected by tuberculosis. It is due to the tubercle bacillus which was discovered by Koch in 1882. The disease, however, has been known from the very earliest times. Hippocrates (460-375 B.C.) first used the term "phthisis," and this word still designates tuberculosis of the lungs. The disease is very common. It has been stated that one-seventh of mankind die from it.

A tuberculous abscess may be present wherever tubercle can be deposited. The usual process of inflammation takes place and pus is formed, but this is of a different nature from that found in an ordinary abscess, and it contains the tubercle bacillus. Such abscesses occur mostly in connection with bones, joints, and lymphatic glands.

When the disease affects the ends of long bones it usually begins in the epiphysis or under the articular cartilage. Sometimes it burrows along the epiphyseal line and reaches a neighbouring joint, or the whole of the cancellous tissue may be affected. The joints themselves are attacked, either the synovial membrane, articular cartilage, or all structures combined.

Symptoms.—General ill-health. High temperature, aching and pain on movement. Wasting of the muscles. Impaired mobility.

Treatment.—Rest. Attention to general health. Various

appliances are used to keep the limb immobile. Massage is forbidden in the early stages. Six months or more after the disease is arrested it may be used together with passive movements, the aim being to strengthen muscles and improve mobility in the joints. The movements require great care, and should not be forced.

TUBERCULOUS DISEASE OF THE SPINE, ALSO CALLED SPINAL CARIES, POTT'S DISEASE, AND ANGULAR CURVATURE

This disease was first accurately described by Percival Pott in 1779.

It is due to tuberculous disease in the bodies of the vertebræ, which become more or less destroyed. The bones sink upon each other, and an angular curve is the result. The severity of the curve depends upon the number of bones which are attacked.

Early Signs and Symptoms.—Pain in the back, specially after standing or walking. There are also referred pains according to the seat of the disease. Stiffness of the spine. (This is specially noticed if the patient stoops to pick something off the floor. The whole body is rotated.) Tenderness to pressure over the spines of the diseased vertebræ. High temperature. Disturbances of circulation and respiration. Sometimes there is paraplegia, owing to pressure on the spinal cord; this generally recovers if the abscess breaks down.



FIG. 22.—ANGULAR CURVATURE, CAUSED BY CARIES OF THE SPINE.

*From a photograph lent by
Mr. Jackson Clarke.*

Later Signs and Symptoms. —Deformity and bony ankylosis of that part of the spine affected by the disease.

Treatment. —Absolute rest. The patient is sometimes fixed in a suspension apparatus, or placed in a box bed.

In the early stage the only massage allowable is gentle manipulation of the arms and legs, viz. effleurage and kneading. Later, not before six months after the disease is arrested, gentle back massage may be added. Breathing exercises are helpful to improve respiration and the mobility of the thorax.

CHAPTER X

FRACTURES:—Varieties of fractures—Epiphyses and diaphyses of bones—Traumatic separation of an epiphysis—The union of fractures—Ununited fractures—The sign of fracture—Early treatment—The treatment of fractures by massage—Passive movements—Hints on massage and movements to recent fractures—In the later stages—*Treatment of special fractures:* The clavicle—The anatomical neck of the humerus—The surgical neck of the humerus—The shaft of the humerus—The olecranon process—Wiring of the olecranon—Other fractures in or near the elbow-joint—Colles's fracture—The bones of the forearm—The neck of the femur—The shaft of the femur—The patella—Pott's fracture—The tibia and fibula—The bones of the foot.

A FRACTURE is the sudden solution of continuity in a bone.

The conditions and influences which are responsible for fractures are many and various. Age is a factor which must be considered, for the strength and elasticity of bones vary considerably at different periods of life, also exposure to injury is very variable. Children are liable to fractures on account of frequent falls. Fractures are commoner in boys and young men than in girls and women of the same age, because they lead a more exposed life, but after forty-five years women are particularly liable to fracture the neck of the femur, and also to Colles's fracture. The bones of old people are very liable to fracture, as they become brittle.

Fractures may occur owing to some morbid condition of the bone, but the most usual may be placed in three classes, viz. those due to:—

(a) Direct violence, *e.g.* a wheel passing over a femur.

(b) Indirect violence; the bone gives way at a distance from where the force is applied, *e.g.* a fall on the hand that fractures the clavicle.

(c) Muscular action. This is commonly the cause of frac-

tures of small bones or prominences into which powerful muscles are inserted, *e.g.* the sudden contraction of quadriceps causing fracture of the patella. Also a sudden contraction of the triceps causes fracture of the olecranon.

VARIETIES OF FRACTURES

"A *Simple Fracture* is one in which the skin is unbroken, or at any rate where the external air has no admission to the site of injury" (*Rose and Carless*).

"A *Compound Fracture* is one in which there is an external wound leading to the seat of fracture, either through the skin or mucous membrane, so that the ends of the fragments communicate with the external air" (*Howard*).

A *Complete Fracture* is one when the continuity of the bone is entirely interrupted. It may be *transverse*, *oblique*, *spiral*, *longitudinal*, *simple*, *compound*, *comminuted*—the bone is broken in more than two pieces. *Impacted*—one fragment is driven into another. *Complicated*—important structures such as an artery or joint are damaged as well as the bone.

An *Incomplete Fracture* is one when the continuity of the bone is not entirely interrupted.

A *Green-stick Fracture* is one that occurs only in young children, and often in those who are rickety. The same effect is produced as when a green twig is broken across the knee.

A *Fissured Fracture* is often incomplete, and must often be X-rayed in various positions before the fracture can be seen.

A *Double Fracture* is one where the bone is broken in two places.

A *Depressed Fracture* is only seen in a fractured skull.

DISPLACEMENT OF BONES IN FRACTURES

Angular.—This may be forwards, backwards, or sideways. It is usually backwards in the tibia.

Longitudinal.—One fragment overlaps the other or is forcibly driven into it, causing shortening of the limb.

Lateral.—The displacement is to one side or the other. There is often delayed union in this form

Rotatory.—The lower fragment is twisted on the upper, as in fracture of the femur, where the weight of the limb causes eversion of the foot.

EPIPHYSES AND DIAPHYSES OF BONES

An epiphysis is the articular end of a bone and the diaphysis is the shaft. In foetal life these are cartilaginous, but bony centres appear in them from which the bones gradually ossify.

During growth the epiphysis remains separated from the shaft for a definite time by a layer of cartilage. This is known as the epiphysial line. Growth of bone takes place at this line; and when the epiphysis becomes united to the diaphysis and the line of cartilage is obliterated, growth ceases, and the bone assumes its complete form.

TRAUMATIC SEPARATION OF AN EPIPHYSIS

This occurs in people under twenty-two years of age. The separation occurs at the epiphysial line. The ends of the femur, humerus, and radius are the bones most often affected.

The treatment of this condition is similar to that of fractures.

THE UNION OF FRACTURES

In order to understand the changes which take place when a bone is fractured, we must first study its structure.

The shaft of a long bone is hollow, and formed of hard or compact tissue. The ends of the bones are encased in hard tissue, but within they are composed of a loose network of bone substance known as cancellous tissue. The hollow part of the bone is called the medullary cavity, and it contains marrow. Covering the outer surface of the bone is a firm, tough, fibrous membrane—the periosteum; and it is from this membrane that the bone derives its blood supply. The periosteum also has an important function to fulfil in the healing of a fracture.

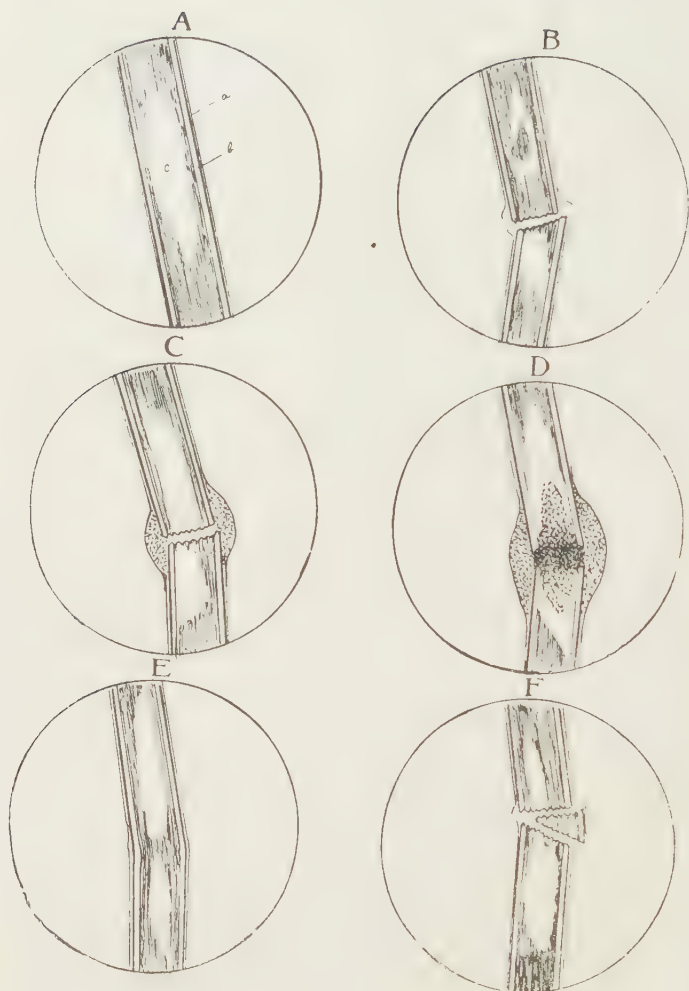


FIG. 23.—DIAGRAM OF UNION OF A SIMPLE FRACTURE.

- A. Normal bone—*a*, periosteum ; *b*, compact tissue ; *c*, medullary cavity.
- B. Fracture, periosteum torn.
- C. Formation of temporary callus, periosteum joined.
- D. Temporary and permanent callus.
- E. Bone united with some deformity.
- F. Comminuted fracture.

From Howard's "Surgical Nursing," by permission of Mr. E. Arnold.

Immediately after the fracture takes place, there is bleeding around, and the broken fragments become embedded in a blood-clot. The periosteum is torn. The injury sets up inflammation and is followed by the formation of a mass of soft tissue known as callus.

Callus is derived from the periosteum, and for the sake of clearness as to its position it is called (*a*) permanent callus, *i.e.* that lying between the broken fragments; (*b*) ensheathing callus, *i.e.* that lying beneath the periosteum, but outside the broken fragments; (*c*) internal callus, *i.e.* that which temporarily fills up the medullary cavity in the region of the fracture.

The callus is usually well formed by the tenth day after the injury and the blood-clot has disappeared. Bony salts are deposited within the callus, and this gradually becomes hardened and harder until there is complete union of the bone.

The better the bones are set or placed in apposition, the more perfect will the union be. By degrees the ensheathing and internal callus becomes absorbed, the medullary cavity reopening. By the end of a year it is often impossible to tell that a bone has been broken. Note that "the granulation tissue is well formed by the tenth day, and the new bone formation begins about the end of the first week, according to the vascularity of the bone and the recuperative powers of the individual the fracture will be consolidated, but in the lower limb it is often eight weeks before the patient can bear any weight upon it" (*Rose and Carless*).

UNUNITED FRACTURES

There are three varieties of ununited fractures:—

(*a*) When there is no union at all.

(*b*) When there is fibrous union, *i.e.* the fractured surfaces are closely united by fibrous tissue. In this form very little callus is formed, and no bone salts are deposited.

(*c*) A false joint. When this occurs there is no union between the fractured surfaces, but the ends of the bones are surrounded and united by a ring of fibrous tissue, forming a false capsule. No synovial membrane or cartilage is present.

THE SIGNS OF FRACTURE

Pain, swelling, great tenderness, loss of power, deformity, abnormal mobility and crepitus.

Treatment.—It is often necessary to render first aid when an accident takes place. Some or all of the above-mentioned symptoms may be noticed, and it is essential to move the injured part as little as possible before the patient is seen and treated by a surgeon.

The local treatment of a fracture consists first in “setting” the limb—*i.e.* in reducing the deformity and restoring the fractured ends to a normal position, and then in fixing them. This is accomplished by the skill of the surgeon, and by the application of suitable splints and apparatus made for the purpose.

THE TREATMENT OF FRACTURES BY MASSAGE

Dr. Lucas Championnière of Paris was the first scientifically to adopt massage and movements for fractures, and it has now become a usual and recognised form of treatment. In this country Sir William Bennett has advocated its use for many years.

A few years ago it was customary for a fracture to be kept quite immovable on a splint for a lengthened period of time, but Championnière and others have shown that prolonged immobility for a fracture and its neighbouring joints is not necessary or wise. In many cases when this was carried out, the patient's joints remained permanently stiff.

It is impossible to master the art of treating fractures by merely reading a description of the process. Handling the injured parts is essential, and every masseuse should obtain means of treating such cases during her training.

The changes taking place with regard to the formation of callus, and the healing of soft tissues, must be continually borne in mind; also the fact that union of a simple fracture occurs normally in 10 to 14 days.

Massage may be applied to fractures very soon after the limb has been “set.” Up to 10 days from the time of

injury, the fracture must be considered a recent one. The objects of massage when applied in this early stage are:—

1. To soothe pain, caused by pressure on the nerve endings.
2. To relieve muscle spasm.
3. To reduce swelling.

In the later stages, viz. 2 weeks after the injury and onwards, its objects are:—

1. To stimulate the circulation, and so help to disperse the accumulation of blood and serum.
2. To prevent muscle waste, and maintain nutrition in all the tissues.
3. To get rid of adhesions.

PASSIVE MOVEMENTS

The objects of passive movements are to prevent adhesions, and maintain mobility in the neighbouring joints. These in many cases are begun quite early after the injury, but must be given with great care, and to a very small degree, then gradually increased. These movements may be said to cause internal massage, for as the tendons glide upon each other during the movement, adhesions of the soft tissues are prevented.

HINTS ON GIVING MASSAGE AND MOVEMENTS TO RECENT FRACTURES

It is important that the patient's position should be comfortable. The limb must be well supported, and the injured part fixed during all movement.

The massage must be very gentle, and consist of effleurage only. This should be first done above the injured part. Gradually the hand is allowed to encroach upon the injury, and finally to pass very lightly over it.

The following may be used as a guide, though such a scheme has often to be varied according to the severity of the injury.

During the first week, light effleurage daily for 15 to 20 minutes. About the third day, add careful passive movements in joints distal to the injury. After 6 to 8 days, add

light frictions, and careful passive movements in all the neighbouring joints.

After 10 days, add kneading of muscles, above and below the injury.

After 3 weeks, treatment may include effleurage, petrissage, frictions, passive and active movements in neighbouring joints.

After 4 weeks, tapotement (hacking) may be added with discretion, but it should never be applied over the seat of the fracture till all tenderness in that region has disappeared.

HINTS ON GIVING MASSAGE AND MOVEMENTS TO FRACTURES IN THE LATER STAGES

This means the stage between union and complete restoration of function. After 4 weeks the treatment must increase in strength; frictions and kneading must be deep, passive movements persistent and regular in stiff joints, and active movements are added.

The patient must be encouraged to do small movements by himself.

If the injury is to the upper extremity, he is urged to move his arm, and to use his hand for small things and gradually increase to large.

If the injury is to the lower extremity, massage and movements may be given as above, but the time is somewhat variable as to when the patient may attempt walking. Many, however, are allowed the use of crutches. It is usually 6 to 8 weeks or longer before the patient can bear the weight of the body on the injured limb.

Some fractures of the lower extremity, *e.g.* Pott's fracture, are put in a plaster-of-Paris splint (Croft's). This after a time is slit up the front, and so can be removed for massage and reapplied. In the chronic stage the treatment of every fracture varies, and much depends upon the skill and persistence of the masseuse as to whether the patient quickly recovers his power and movement.

TREATMENT OF SPECIAL FRACTURES

FRACTURE OF THE CLAVICLE

A fractured clavicle is often caused by indirect violence, e.g. a fall on the shoulder or outstretched arm.

The attitude of the patient in a recent case is characteristic. The elbow of the affected arm is supported with the other hand, and the patient inclines his head towards the broken bone. After the fracture has been set, the weight of the arm should be supported by a sling and tied over the opposite shoulder. The pain may be soothed by hot fomentations and massage.

Massage may be given from the first, and during treatment the elbow must be supported to prevent the weight of the arm dragging on the clavicle. From the first day give effleurage over the arm, shoulder, and neck, and on the third day add small passive movements in the shoulder, carefully supporting the joint. The strength of the massage is gradually increased, adding frictions round the joints and gentle muscle kneading. On the seventh day limited active movements are allowed, and gradually increase in range as the treatment proceeds. All muscles of the arm must be treated, paying special attention to those attached to the clavicle. Active movements in the elbow, wrist, and fingers may be given from the first.

FRACTURE OF THE ANATOMICAL NECK OF THE HUMERUS

An Intra-capsular Fracture.—This is usually caused by direct violence, as in a fall upon the shoulder, and is often accompanied by comminution of the tuberosities.

A pad is placed in the axilla, the joint protected by a cap, the arm bandaged to the side and placed in a sling. Massage may be given from the first—effleurage, over the whole shoulder region. After 3 or 4 days add careful and limited passive movements. After 1 week add gentle frictions and active movements. At first only slight abduction, then a forwards and backwards movement, and last rotation.

After treatment, when the arm is supported in a sling, the

hand is left free for movements of the wrist and fingers from the first.

After 3 weeks the following may be given: Effleurage of the upper arm and shoulder. Frictions round the joint. Petrissage of all muscles groups. All passive and active movements in shoulder, elbow, wrist, and hand. A little later, urge the patient to use the arm. Continually compare the range of movement with the normal arm. Crawling up the wall with the fingers is useful.

FRACTURE OF THE SURGICAL NECK OF THE HUMERUS

Fracture of the surgical neck of the humerus is generally caused by a fall on the shoulder, elbow, or hand.

The injured limb may be set (*a*) upon a triangular-shaped splint, which keeps the humerus in an abducted position; (*b*) an internal angular splint; or (*c*) the arm is laid upon a wedge-shaped cushion which has its apex in the axilla, and the arm firmly bandaged to the side. Gooch's splinting is sometimes applied on the outer side of the arm, or a protective cap placed over the shoulder. When the internal angular splint is the one chosen, the arm is carried in a sling with the elbow lower than the hand, as the weight of the arm thus produces some extension.

Massage may be given from the first, following much the same course as that described for fracture of the anatomical neck, but if an internal angular splint is used, it must not be removed for treatment before the eighth day, and no movements may be given in the shoulder before this time, unless specially ordered. When these are begun all other movements should be given before rotation.

Special attention must be given to deltoid from the first, as it wastes quickly. The patient must be taught to gently contract the muscle.

FRACTURE OF THE SHAFT OF THE HUMERUS

Fracture of the shaft of the humerus is a fairly common accident, and is due to direct or indirect violence, and sometimes to sudden muscular contraction. It may take place at any point along the shaft.

This fracture is fairly liable to complications, a small fragment of muscle or connective tissue may pass between the broken ends of bone and cause great pain, and in some cases hinder union. The musculo-spiral nerve may be involved, resulting in the loss of power of the extensor muscles of the wrist which it supplies. The nerve is especially exposed to injury in the musculo-spiral groove, where it lies quite close to the bone. It sometimes becomes embedded in the callus of a fracture. This matter is further considered in the chapter on nerve injuries.

The fracture is usually set upon an internal angular splint, reaching from the axilla to the wrist, and several small lateral splints, or a piece of Gooch's splinting is applied on the outer side.

Massage may begin from the first, removing only the lateral splints or Gooch's splinting. Effleurage above the seat of the fracture, then passing very lightly over it with great care. Effleurage of the forearm and hand. Active movements to wrist and fingers.

After 3 or 4 days add gentle frictions to the shoulder, elbow, and wrist joints; gentle kneading of the forearm and hand.

After 10 days add gentle petrissage of the muscles and limited passive movement to the shoulder, after the fracture is fixed by the splint and bandage. A little passive movement to the elbow (if free) may also be given with great care. The massage and movements are gradually increased, and after 3 weeks should include firm effleurage, muscle kneading of all groups, friction of the joints, and all active movements.

Note.—Movements may be given in normal cases, but the surgeon's permission is often necessary as complications are not infrequent.

Later in 5 or 6 weeks the active movements may be given with some resistance. Crawling up the wall with the fingers may be done, and the patient must be urged to use the limb.

FRACTURE OF THE OLECRANON PROCESS

The injury is usually caused by direct violence, but sometimes by the action of the triceps muscle. Some surgeons set

the arm fully extended, others place the elbow in a semi-flexed position, the arm being at an angle of about 135° , *i.e.* midway between full extension and the right-angle position.

Massage may be given from the first and should consist of light effleurage from the hand to the shoulder, paying special attention to the triceps muscle. On the third day give passive flexion and extension to the elbow to a very small degree, supporting the elbow and keeping the fragment pressed down. On the fifth to seventh day add cautious extension of the joint, still supporting the fragment. The massage is gradually increased and should include effleurage, frictions, petrissage of all muscles acting on the joint. Movements are also gradually increased, but flexion must not pass a right angle for at least 2 weeks, and full extension or raising the arm above the head must not be done for at least 3 weeks after the accident. Movements may be given to the wrist and fingers from the first.

Note.—If complications have occurred movements must not be given without the surgeon's permission.

Wiring of the Olecranon.—Fracture of the olecranon is frequently treated surgically, the fragment being placed in position and fixed by wire to the ulna. When this is done, massage cannot begin until the wound is healed and the stitches removed. This generally takes place about the eighth day after the operation. Gentle massage may then be given, including effleurage, frictions, petrissage, and movements, but the last must be done with great caution, and very gradually as described above.

Aseptic precautions must be taken, and gentle manipulations given round the area of the scar to loosen it.

OTHER FRACTURES IN OR NEAR THE ELBOW-JOINT

Other fractures in the elbow region may be: (a) Fracture of the bone into the line of the joint. (b) Fracture of either condyle. (c) Separation of the epiphysis.

Massage may be given at once in the form of soothing effleurage, and on the third day minute movements to the elbow should be added. Friction should not be given in the

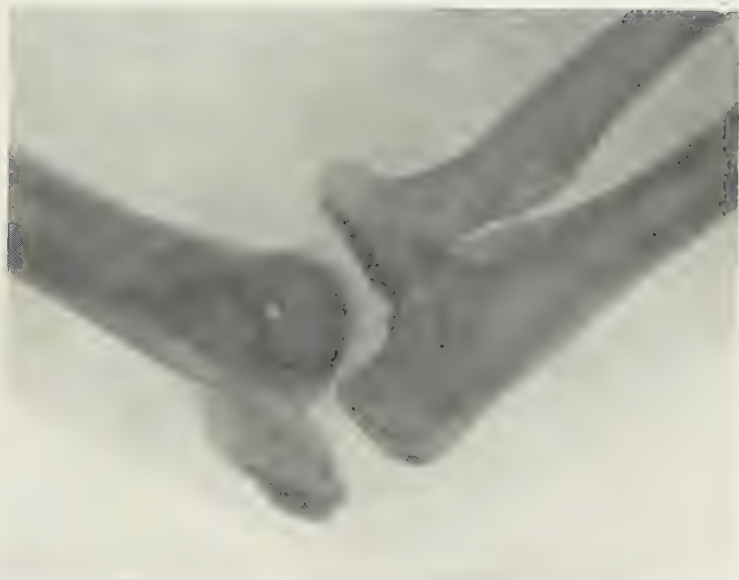


FIG. 23*a*.—FRACTURE OF THE OLECRANON PROCESS



FIG. 23*b*.—FRACTURED OLECRANON AFTER WIRING.

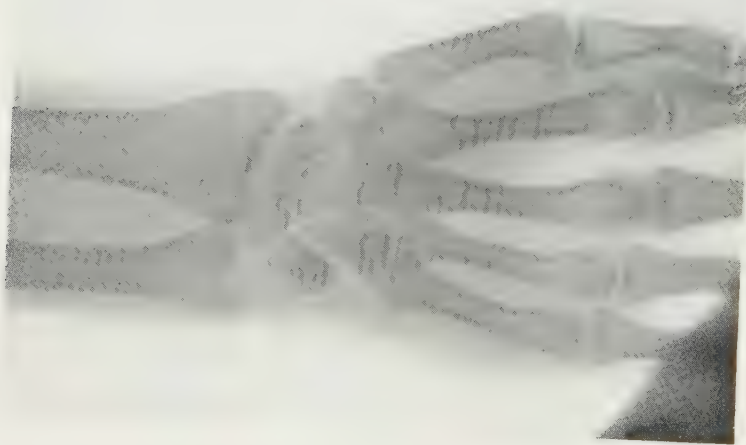


FIG. 24.—RIGHT COLLES'S FRACTURE.
POSTERO-ANTERIOR VIEW.



FIG. 25.—RIGHT COLLES'S FRACTURE
LATERAL VIEW.

From photographs lent by Dr. Stanley McVillie.

early stages, neither should the movements be forced for fear of promoting too much callus.

The massage should be gradually increased, adding gentle petrissage of the muscles and after 2 weeks frictions round the joint.

Later, if the joint remains flexed it requires careful stretching. The following may also be given to help extension (after 4 weeks): hanging, swinging the arm with a weight in the hand, single arm upstretching, concentrically and eccentrically.

The recovery of full movement in the elbow after any injury is perhaps more difficult and trying than that of any other joint. It is also a well-known fact that flexion is much more difficult to recover than extension, and for this reason many surgeons set an injured elbow in a fully flexed position, in order to ensure the flexion.

COLLES'S FRACTURE

This fracture takes its name from an eminent Dublin surgeon, who first described it. The injury occurs most frequently to elderly women. It is due to a fall on the outstretched hand.

The seat of fracture is at the lower end of the radius,



FIG. 26.—COLLES'S FRACTURE.
LATERAL VIEW, SHOWING DINNER-
FORK DEFORMITY.



FIG. 27.—COLLES'S FRACTURE.
PALMAR VIEW.

By permission, from Rose & Carless's "Manual of Surgery" (Baillière, Tindall & Cox, London).

$\frac{3}{4}$ inch above its articular surface. Frequently the styloid process of the ulna is severed, and the internal lateral ligament ruptured. The fractured portion of the radius is often impacted. It may be comminuted. "The lower fragment is driven backwards and upwards, and rotated to the radial side, carrying the hand with it into the position of abduction, and leaving the tip of the radius, at the same level

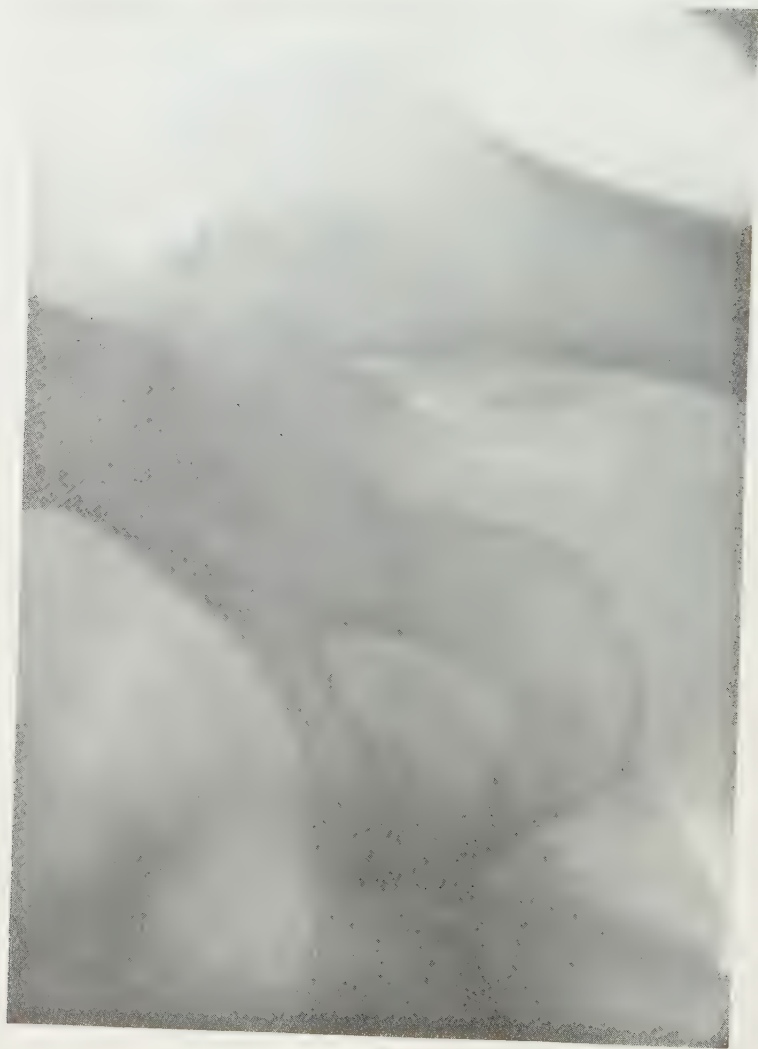


FIG. 29.—FRACTURE OF THE NECK OF THE FEMUR.
From a photograph lent by Dr. Stanley Metville.

FRACTURE OF THE BONES OF THE FOREARM

This is generally caused by direct violence. One or both bones may be broken. The fracture is reduced, and splints applied, free movement being allowed at the elbow and a little at the wrist.

Such cases may benefit by massage, but it is not so essential for them as for those fractures occurring near to joints.

When ordered the usual course may be adopted. Pronation and supination must be given with care.

FRACTURE OF THE NECK OF THE FEMUR

Fractures of the neck of the femur may be either intra- or extra-capsular. The intra-capsular variety is most frequently seen in women of advanced age. This fact is explained by the atrophic changes which take place in the neck of the femur of elderly people. The accident is due as a rule to some slight stumble or fall, the bone yields and the patient falls to the ground. The line of fracture may be transverse or oblique. Impaction is not usual, and if the patient is healthy there may be bony union, but a loose fibrous union is often the only result. The extra-capsular variety is usually caused by direct violence—*e.g.* a heavy fall upon the hip. The line of fracture is along the attachment of the capsule in front, and below it behind. The great trochanter is often involved, and may be comminuted. There is usually impaction. Union of the fragments is more certain in this variety than in the intra-capsular. Eversion is characteristic in both forms of the fracture, and with it the limb lies on its outer side.

Treatment.—For young people splints and extension are applied, usually a long Liston's or plaster casing. The splint is not removed for from 6 to 8 weeks, so little massage can be applied. Effleurage, frictions, and toe and ankle movements may be given if possible.

When the splint is removed the usual manipulations may be applied, also movements in the hip, knee, and ankle given gradually. For old people the following is more often adopted:—

The limb is placed in a good position, and supported by sand-bags. Gentle massage may be given as soon as the patient has been made comfortable in bed. Effleurage for 10 to 15 minutes twice daily, on the outer part of the thigh and hip-joint. This will relieve pain and muscle spasm. According to Lucas Championnière, massage over the inner aspect of the thigh, passing over large veins, should be avoided, as there is danger of setting free a clot.

After 10 to 15 days the patient should get up and move about with assistance and on crutches. The weight of the body cannot be borne on the injured limb for at least 3 months; but when the patient first gets up, gentle swinging movements of the thigh should be encouraged, and massage and movements gradually increased to the following:—

Patient lying supine—Effleurage of whole leg and hip-joint. Frictions round hip and into groin. Petrissage and kneading of all muscle groups.

Patient lying prone—Effleurage, frictions, kneading, tapotement of back of hip and thigh.

Patient lying supine—Passive and later active movements in hip. Active movements of knee, ankle, and foot.

FRACTURE OF THE SHAFT OF THE FEMUR

In spite of the great strength of the femur, fracture of the shaft is a common accident. It may occur at any point, and be due to either direct or indirect violence, and there is nearly always displacement of the bone. The fracture is set in various ways, according to its situation. A long Liston's splint is often used, and extension is frequently necessary.

The splint generally remains on for from 6 to 8 weeks, till there is solid union of the bone. During this time the strapping which fixes the splint is not removed, so massage can only be given in a limited way. Effleurage and frictions round joints where possible, and movements to toes and ankle. Massage is often entirely delayed until the splint is removed after 8 weeks. The thigh and leg may then be treated with effleurage, petrissage, and frictions, and movements to the hip and knee are added with great caution, when the doctor



FIG. 30.—TRANSVERSE FRACTURE OF THE PATELLA, SHOWING
CONSIDERABLE SEPARATION OF THE FRAGMENTS.

From photographs lent by Dr. Stanley Melville.

considers union secure. At this stage the patient may usually begin to walk on crutches, but the leg is often encased in plaster of Paris for another 4 to 6 weeks. At the end of this time, when the plaster is removed, much deep massage is required.

FRACTURE OF THE PATELLA

Fracture of the patella is due to direct violence, or to sudden muscular contraction.

"When the knee is semi-flexed, the patella is poised upon the front of the condyles of the femur, resting upon the middle of its articular surface; in this position any sudden and violent contraction of the quadriceps, as in attempting to recover one's equilibrium after having slipped, takes the bone at a disadvantage, and may succeed in snapping it." "The signs of this fracture consist of loss of power in the limb, pain, distension of the joint with blood, and separation of the fragments. This displacement is due to unopposed muscular action." "Fibrous union is the usual result, and when this is short and strong it may be quite satisfactory" (*Rose and Carless*).

If the patient be a suitable subject for operation, this fracture is generally treated surgically. The bone is exposed, the joint is cleared of all blood-clot; tags of fasciæ which may curl over the broken surfaces are removed, and finally the fragments are securely wired together. Bony union may be looked for when the fracture is thus treated.

The limb is usually placed on a back splint, and massage is applied for the following reasons—to prevent the upper fragment adhering to the femur, to relieve synovitis, and to prevent adhesions and muscle waste.

When no operation has taken place the following may be given:—

Effleurage of the whole limb, which may begin as soon as the limb is "set." The strokes are first given above and below the joint, and by degrees they pass very lightly over it. Throughout the manipulations the upper portion of the patella should be fixed with one hand while the strokes are performed with the other.

After 1 week add gentle frictions round the patella and on each side of the knee-joint. Gentle kneading of the thigh and calf muscles. Limited passive movements of toes and ankle.

After 10 days add careful manipulation of the patella from side to side.

After 2 weeks, with the surgeon's approval, add slight flexion and extension of the knee, giving much support. Place one hand above the patella to fix it, and the other beneath the knee and carefully raise it.

The treatment should gradually increase in strength until it includes the following :—

Effleurage of the whole limb. Frictions over the knee, with special manipulations of the patella from side to side. Petrissage, kneading (and hacking) of all muscle groups of the thigh and lower leg. Special attention should be given to quadriceps femoris and those muscles which insert into the ilio-tibial band.

Passive and later active movements to the toes, ankle, and knee. After about 4 weeks the leg may be flexed over the edge of the bed, and movements given in this position with much care and support. Later add passive and active movements in the hip-joint.

When the fracture has been wired, massage is delayed until the wound caused by the operation is healed. Effleurage and gentle kneading can sometimes be given to the thigh and lower leg in the early days, but no manipulations are possible over the joint until the stitches are removed about the tenth day. The patella must then be moved from side to side, and gentle frictions given, taking care not to drag the scar, and avoiding effleurage over the wound until the skin is firm. Careful passive movement in the knee should also be given at this stage, and the whole treatment be gradually increased in strength as already described. After wiring, the patient usually walks in 4 to 5 weeks.

POTT'S FRACTURE

A fracture of the lower end of the fibula, 3 inches above the tip of the malleolus, is known as a Pott's fracture. There



FIG. 31.—POTT'S FRACTURE, POSTERO-
ANTERIOR VIEW.



FIG. 32.—POTT'S FRACTURE, LATERAL VIEW.

From photographs lent by Dr. Stanley McCallie.

is outward displacement of the foot, and rupture of the internal lateral ligament. Sometimes the tip of the internal malleolus is also fractured.

"Fractures in the neighbourhood of the ankle-joint are usually produced by indirect violence, the foot slipping, and leading primarily to a displacement of the ankle, the fracture being a secondary *résultat*." "In Pott's fracture sudden abduction of the foot results in severe strain upon the internal lateral ligament, which gives way, or the base of the internal malleolus is torn off. The astragalus is thereby driven against the inner aspect of the external malleolus, and tends to displace that portion of bone outwards. The force is then transferred up the fibula, which bends and breaks at its weakest spot." "The foot is rotated out or abducted, the heel is drawn up, whilst the toes point downwards" (*Rose and Carless*).

After reduction, the foot is placed on some type of splint, usually an ordinary back splint with a foot-piece. Side splints are also applied and are fixed independently by bandages or straps at the ankle and knee.

Massage may be given from the first, but only the side splints are removed. Effleurage is given where possible, and passive movements to toes. About the fifth day the bandage fixing the foot-piece may be removed, and effleurage and gentle frictions given to the foot, also very limited passive movement to the ankle-joint. About the tenth day the leg is lifted from the splint for treatment, when gentle kneading may be added and limited movement in the knee.

Three weeks after injury the treatment should include: Effleurage, frictions round the seat of fracture, ankle, and foot. Petrissage and kneading of the muscle groups. Passive and active movements in toes, foot, and ankle.

After 10 to 14 days this injury is frequently encased in plaster of Paris and the patient allowed to walk on crutches. This delays massage, but after 2 to 3 weeks the plaster casing is opened up the front and so can be removed for massage and reapplied.

In 5 to 7 weeks, according to the weight and condition of the patient, the plaster is removed altogether, and the patient

told to begin to bear weight on the foot. After wearing a plaster splint, the tissues often become very hardened, and require deep and persistent massage before they are restored to their normal state.

FRACTURE OF THE TIBIA AND FIBULA

Fracture of the tibia and fibula is a very common accident. One or both bones may be broken. After reduction by the surgeon, this fracture is usually set on a back splint with a foot-piece. Side splints are also often applied with straps and buckles outside the bandages which fix the back splint.

Massage may be given from the first. Side splints are removed, but the back splint must not be disturbed. Give effleurage above the seat of injury, then passing lightly over it. Slight passive movements in the toes.

After 1 week add light frictions, and the foot-piece of the splint should be loosened to allow of slight passive movement in the ankle-joint.

After 2 weeks, in a straightforward case, the limb may be carefully lifted from the splint for treatment, and the massage be gradually increased in time and strength.

After 3 to 4 weeks the treatment should include:—

Effleurage, frictions of the foot, ankle, and over the seat of injury. Petrissage and kneading of the calf muscles. Passive and active movements in foot, ankle, and knee.

This fracture, like the Pott's, is often encased in plaster of Paris for several weeks. It is often 8 to 10 weeks before the patient can bear his weight upon the limb at all.

FRACTURE OF THE BONES OF THE FOOT

Fracture of the tarsal bones occasionally occurs. It may happen when the foot is severely crushed; the result is usually comminution of the bones. Os calcis and astragalus are fractured by falls on to the feet from a height.

Treatment.—The foot is often immobilised in plaster of Paris for a time, but as soon as this is removed massage and movements are given to restore mobility and strength.

CHAPTER XI

DISLOCATIONS :—Traumatic dislocations—Signs of dislocations—Treatment—Shoulder—Elbow—Hip—Knee and ankle—Congenital dislocations—Sprains—Sprain and rupture of muscles and their tendons—Synovitis—acute—chronic—Teno-synovitis—Bursitis—Knee-joint—Displacement of semilunar cartilage—Other injuries of the knee-joint—Stiff joints—Volkmann's ischæmic paralysis.

A DISLOCATION is an abnormal condition occurring in a joint when the articular surfaces of bones are displaced from each other.

A complete dislocation, also called a luxation, is one in which the articular surfaces of the bones are completely separated from one another.

An incomplete or partial dislocation, also called a subluxation, is one in which the surfaces are only partially separated.

Bones may dislocate in any direction, and may be accompanied by fracture. The dislocations may be traumatic or congenital.

TRAUMATIC DISLOCATIONS

These occur most frequently during adult life. Direct violence applied to or near the joint of a child is more likely to lead to a separated epiphysis than a dislocation, and in old people the bones become more brittle, so fractures more commonly occur. Dislocations are more frequently seen in men than in women, owing to their greater exposure to injury.

Signs of Dislocations.—(a) Pain. (b) Swelling and bruising of soft tissues, caused by effusion of synovial fluid into the joint cavity, and extravasation of blood and lymph into the

surrounding tissues. (c) Deformity of the limb. (d) Loss of function.

Changes.—The joint capsule and other ligaments are stretched and torn. The end of the bone may partially or completely protrude through the capsule. Some or all of the following structures may be involved:—Skin, subcutaneous tissues, deep fasciæ, muscles, nerves, arteries, veins, synovial membranes, articular and inter-articular cartilages.

Treatment.—The first part of the treatment of a dislocation is entirely in the hands of the surgeon. It must be reduced with as little delay as possible, and it is very important that the bone should return to its normal position by the same path by which it left it, in order to prevent fresh lacerations of the capsule and other soft parts. Muscle contraction may cause great difficulty in reduction, but this is overcome if the patient is anæsthetised.

The limb is subsequently kept at rest for some days, to allow the rent in the capsule to heal. Cooling lotions may be applied, and in a few days' time gentle massage and movements begun.

At first effleurage to promote the absorption of effusion and to relax muscular spasm. Then gentle frictions must be added to prevent the formation of adhesions and help the process of healing. Later kneading and petrissage of neighbouring muscles to prevent wasting and promote nutrition and circulation.

When swelling and inflammation have subsided, very careful passive movements may begin. The injured joint must be well supported during movement.

The masseuse should find out in which direction the dislocation has taken place, and apply her movements with great care accordingly.

After 3 weeks active movements are added.

DISLOCATION OF THE SHOULDER

This dislocation is more common than any other. It may take place in several directions: (a) Downwards—subglenoid. (b) Forwards—sub-coracoid. (c) Backwards—sub-spinous. (d) Upwards—sub-acromical (this is very rare).

Treatment.—After reduction a wool pad is placed in the axilla, the arm bandaged to the side and forearm supported in a sling.

Soothing massage may begin at once and should be daily. Effleurage, and in a few days gentle frictions are added.

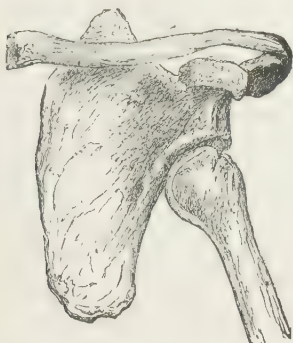


FIG. 33.—SUB-GLENOID DIS-
LOCATION OF SHOULDER.



FIG. 34.—SUB-SPINOUS DIS-
LOCATION OF SHOULDER.



FIG. 35.—SUB-CORACOID DISLOCATION OF SHOULDER.

*By permission, from Rose & Carless's "Manual of Surgery"
(Baillière, Tindall & Cox, London).*

In 3 to 5 days after reduction careful and limited passive movements may be added. The shoulder must be well supported and the arm kept to the side. Abduction and rotation should be the last movements given. The massage and movements must be gradually increased, and at the end of

1 week bandages may usually be discarded and a sling only used, and treatment include the following :—

Deep effleurage. Frictions round joint three times. Petrisage and kneading of all muscle groups acting upon the joint. (Hacking.) Passive and active movements.

By degrees patient should be encouraged to do free active movements, *e.g.* touching chin, head, back, etc., and crawling up the wall with his hand.

DISLOCATION OF THE ELBOW

This usually consists in the radius and ulna being displaced backwards from the lower end of the humerus. The ulna may alone be displaced. The head of the radius may be displaced forwards, backwards, or downwards. Lateral displacements of the joint are very rare. It is not uncommon for dislocation of the elbow to be accompanied by fracture.

A common occurrence in children is dislocation of the radius downwards. It is generally known as "pulled elbow." This condition is the result of dragging a child along by the hand.

"The radial head is separated from the capitellum of the humerus and a portion of the orbicular ligament slips in and becomes nipped between the articular surfaces. The child cries with the pain, and keeps the elbow semi-flexed, while tenderness and swelling are noted on examining the joint from behind" (*Maynard Smith*).

Treatment after Dislocation of the Elbow.—Gentle massage may begin as soon as reduction has taken place. Support the limb well.

Effleurage above the injury, and then over the joint, also gentle frictions. On the third or fourth day very careful and limited passive flexion and extension may be added.

Massage may be gradually increased in strength, and 3 weeks after the injury treatment may include the following :—

Effleurage above first, then all over joint and forearm. Frictions round the joint three times. Petrisage of muscles above and below. (Hacking.) Flexion and extension of elbow, passively and actively.

Note.—Movement in this joint after injury is often only

recovered after much manipulation, which requires great care and perseverance. It is best to give much passive movement in small excursions, first aiming at flexion and then extension.

DISLOCATION OF THE HIP

As a result of injury, this is not a common condition, but when it occurs it may take place backwards or forwards.

Backwards Dislocation may be (a) dorsal—when the head of the femur lies on the dorsum of the ilium, above and behind the acetabulum; (b) sciatic—the head lies also on the dorsum of the ilium, but lower down.

Forwards Dislocation may be (a) obturator—the head of the femur lies over the obturator foramen; (b) pubic—the head of the femur lies on the horizontal ramus of the pubis.

Treatment.—After reduction the patient is kept at rest, and gentle massage given—effleurage and frictions. After a week careful passive movement may be added. Three weeks after reduction, treatment should include the following:—Effleurage, frictions over the joint, petrissage, kneading, hacking, clapping (and beating) of thigh and gluteal muscles.

Passive and active movements with great care.

DISLOCATIONS OF THE KNEE AND ANKLE

Dislocations of the knee and ankle are rare; the latter seldom occurring except when accompanied by a fracture.

The after-treatment of a dislocated knee consists of much soothing massage to reduce synovitis, and later deep frictions and muscle kneadings above and below to strengthen the joint, together with careful passive and later active movements.

CONGENITAL DISLOCATIONS

The cause of this condition is said to be due to an error in development. The hip is most often affected, but similar conditions are sometimes seen at the shoulder, elbow, and wrist.

Dislocated Hip.—The malformation may be unilateral or

bilateral. It occurs more frequently in girls than boys. It is often unnoticed till the child begins to walk, then with single dislocation the child limps, with double there is a duck-like gait. There is often a considerable amount of lordosis.

Surgical treatment is essential. The hip is reduced, and the limb placed in an abducted position, and fixed on a splint or in plaster. After 6 to 8 months the limb is brought to its normal position again, and massage and movements may be ordered:—

Effleurage and frictions over the joint. Effleurage, petrissage, and tapotement of gluteal muscles, also of thigh and lower leg.

All passive movements in the hip-joint, but with great care, always having the pelvis fixed by a second person. Passive and active movements in the knee and ankle.

During the time the patient is in plaster the surgeon may order active flexion and extension to be given daily in the knee-joint. This movement when the thigh is abducted tends to force the head of the femur more deeply into the acetabulum.

SPRAINS

A sprain is the result of sudden violence applied directly or indirectly to a joint. There may be tearing of the capsular and other ligaments, involving injury to synovial membrane. There is pain and inflammatory effusion; also bleeding into the surrounding tissues if the injury is severe. The ankle is the joint most commonly sprained.

Massage aids the recovery of a sprain in a third of the time that it would otherwise take. It may begin immediately and should consist of effleurage above the seat of injury, and then with great care passing over it. This procedure will soothe the nerve endings and reduce the swelling.

Careful and limited passive movements should also be given to the affected joint, while those distal to the injury should be freely moved. Treatment should be applied daily for from 10 to 20 minutes. It must gradually increase in strength and after 2 weeks should include the following:—

Deep effleurage, frictions round the joint, and petrissage

of muscles above and below. Passive and active movements. Active flexion and extension may be given as soon as acute inflammation has subsided, but if any lateral ligaments are torn any movement dragging on these injured ligaments should not be given for a week. The early treatment of sprains is much the same as for fractures, and on account of swelling fractures may be often overlooked.

Soothing lotions are ordered as a rule for application between massage treatments, but these may be generally discontinued after a week, a firm bandage only being worn between the massage.

SPRAIN AND RUPTURE OF MUSCLES AND THEIR TENDONS

“Sprains and strains due to violent efforts or falls result in the tearing and stretching of some of the muscle fibres” (*Rose and Carless*).

If the injury is very severe, the muscle may be torn from its periosteal origin. The rupture may occur in the muscular belly, or between the muscle and its tendon.

Rupture of a muscle or its tendon is a common occurrence in men over forty years of age, the muscles most often affected being those inserting into tendo-achilles. It happens to people of sedentary habits who suddenly take some violent exercise. At the moment of the accident the patient experiences a sharp and severe pain, as if he had been struck by a whip. He may also feel and hear a snap. Swelling and bruising will follow together with loss of function.

Treatment.—Rest for 1 to 2 weeks, keeping the affected muscle in a relaxed position.

Massage may then be given. Much effleurage. Frictions on and round the seat of injury. Petrissage (and hacking) of muscles. Passive and later active movements in the joints upon which the affected muscle is working.

SYNOVITIS

“By synovitis is meant an inflammation limited almost entirely to the synovial membrane of a joint, the ligaments and other structures of the joint are but little affected” (*Rose and Carless*).

The condition may be due to cold, injury, rheumatism, gout, etc.

"Acute synovitis results in hyperæmia of synovial membrane and exudation of plasma. . . . After a time the plasma may coagulate, depositing lymph upon the articular surfaces, whilst serum remains. The lymph thus deposited may either be removed by a natural process of absorption when the inflammation comes to an end, or it may organise and form adhesions. In the later stages the synovial membrane becomes somewhat thickened" (*Rose and Carless*).

Symptoms.—The joint is painful and distended. If the affected joint is a superficial one, e.g. the knee, a sense of heat may be imparted to the hand. The surface may also be red. "The limb is maintained by muscular spasm in that position which gives the most ease. Generally one of slight flexion. The muscles governing the movements of the joints may undergo rapid atrophy."

"The knee-joint when distended with fluid presents a rounded outline, in which all the normal hollows, especially those on either side of the patella, have disappeared. There is also a swelling corresponding to the sub-crureal pouch, more marked on the inner than the outer side of lig. patellæ below, or by alternate pressure on either side of the rectus tendon. When effusion is large in amount, the patella is felt to float, and on pressing it sharply backwards it can be made to tap against the intercondyloid notch of the femur."

"The elbow-joint when affected with synovitis has generally a little puffiness in front of the joint. On the back the hollows on either side of the olecranon and tendon of the triceps are replaced by soft fluid swellings, the outer of which also extends down to and masks the head of the radius" (*Rose and Carless*).

Treatment.—In all severe cases the patient must be put to bed and the limb elevated. The limb often must be kept at rest on a splint. Soothing lotions, ice-bags, etc., are applied to reduce the inflammation. During this acute stage the patient will sometimes have a high temperature, and if this is the case massage is contra-indicated. When the temperature has become normal, and pain subsided somewhat, very

gentle effleurage may be given for 10 to 15 minutes twice daily, and the treatment gradually increased as the condition improves. The following may be added by degrees :—Deeper effleurage, gentle frictions, petrissage (and hacking) of muscles above and below the injury. Passive movements when swelling has subsided, and later active.

CHRONIC SYNOVITIS

The synovial membrane becomes thick and infiltrated. There is stiffness and weakness in the joint. Sometimes pain on movement. Swelling may still be present, which is often increased by standing and walking. Creaking sounds may be heard.

Sometimes synovial fringes become hypertrophied, and loose ends may be caught in and nipped between the bone.

Treatment.—Deep massage over the joint. Much friction and tapotement. Deep petrissage of the muscles acting on the joint. Passive and active movements. Time, 20 to 30 minutes daily.

TENO-SYNOVITIS

“ The synovial membranes which line the sheaths of tendons may become inflamed as the result of injury or infection.

“ Acute teno-synovitis often follows sprains and strains, and is most commonly seen with the extensor muscles of the thumb. A puffy swelling in the course of the tendons is produced, painful on movement and perhaps tender to the touch, giving a characteristic fine crepitus whenever the parts are moved ” (*Rose and Carless*).

Treatment.—The limb is immobilised for a few days, and fomentations applied. When the acute symptoms have disappeared massage may be given: Effleurage, frictions, passive and active movements.

BURSÆ AND BURSITIS

A bursa is a small sac of synovial membrane of variable size, containing serous fluid. Many bursæ are normally present in the body, between surfaces which move upon each other, as between tendon and bone, or between a pro-

jecting surface of bone and the skin. Their use is to prevent friction, and to enable structures to glide freely upon each other. The most important bursæ are situated: Between the deltoid muscle and the capsule of the shoulder-joint; between the olecranon process and the skin; between the big flexor muscles of the hip and the capsule of the joint, and a large one which separates the gluteus maximus muscle from the trochanter of the femur.

There are numerous bursæ in the neighbourhood of the knee-joint, the chief being (*a*) that over the patella, (*b*) between the ligamentum patellæ and the tibia, (*c*) in the popliteal space between the semi-membranosus muscle and the inner head of gastrocnemius.

New bursæ sometimes develop as the result of continued pressure. This may happen as the result of a deformity, *e.g.* in talipes equino varus a bursa forms over the cuboid; a tailor may develop a bursa over his external malleoli, and a porter carrying heavy weights on his back may have one over the vertebral prominence.

Bursitis is inflammation of one of these serous sacs. It is usually the result of injury. In the acute stage there are the usual signs of inflammation, and the swelling and redness extend a variable distance above and below the inflamed bursa. In the chronic stage the fluid accumulates and distends the bursa. The neighbouring joint feels weak, but there is not necessarily pain and tenderness.

"Housemaid's knee" is the name commonly given to an inflammation of the pre-patella bursa. The affection may be acute or chronic, the swelling being central in front of the patella. If the bursa beneath the ligamentum patellæ is attacked, a fluctuating swelling is seen and felt on each side of the tendon, specially when the knee is extended. Enlargement of the bursa over the olecranon process is known as "miner's or student's elbow."

Treatment.—As for synovitis.

In one form of bursitis the walls of the bursa become thickened, and a hard fibroid tumour is formed. Surgical treatment is generally necessary for this. Massage and movements may be ordered later to restore mobility to the knee-joint.

KNEE-JOINT

A clear understanding of the structure and mechanism of the knee is necessary before abnormal conditions of the joint can be taken in hand.

The student should be familiar with the attachments of semilunar cartilages and crucial ligaments ; also the position of synovial membrane. The following other points are important :—

The joint is the largest in the body, and on account of the strain continually thrown upon it, and its exposed position, it is very liable to injury.

It is a ginglymus joint of a complicated kind ; in the extended position no lateral movement is possible, but in extreme flexion some lateral and rotatory movement may take place.

The ilio-tibial band is important in helping to maintain the stability of the knee-joint. At its lower end it is in connection with the capsule of the knee, exerting a traction upon it, and at its upper end it receives a large portion of the gluteus maximus and all the tensor fasciæ femoris. Weakness of these muscles, therefore, will indirectly cause a weakened knee-joint.

DISPLACEMENT OF A SEMILUNAR CARTILAGE

This condition is often met with as a result of a sprain or strain, the injury usually taking place when the knee is flexed, so that some rotatory movement of the joint is possible. It is a common accident to football, tennis, and hockey players.

“ The internal cartilage is much more frequently affected than the external, and the character and extension of the lesion varies very much in different cases. Not infrequently its anterior tibial attachment is torn through, thereby permitting considerable lateral mobility. Its peripheral connections with the capsule and internal lateral ligament may also be ruptured, whilst sometimes a portion is more or less detached from its free border, and in other cases the cartilage has been broken across a little behind its centre. It is obvious that when once its connections have been loosened it can be

displaced readily, and may pass into the intercondyloid notch, or may slip out from the tibia and femur, or may even be doubled over. It subsequently becomes inflamed and swollen, and unless properly treated the displacement is likely to be repeated" (*Rose and Carless*).

The loosened cartilage is usually displaced inwards, and a slight deficiency may be present above the edge of the tibia on the affected side.

Symptoms.—1. Severe pain, with or without the sensation that something has given way. 2. Locking of the joint in a position of flexion, with inability to extend. This con-

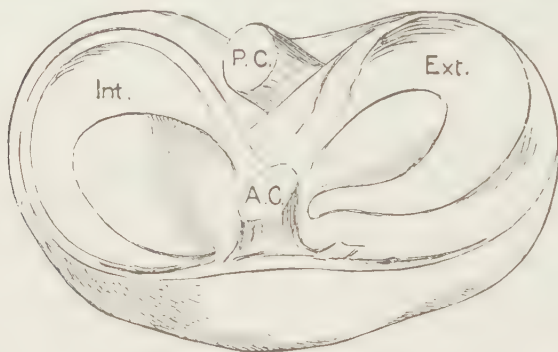


FIG. 36.—DISPLACEMENT OF EXTERNAL SEMILUNAR CARTILAGE.

From Sir William Bennett's "*Recurrent Effusion into the Knee Joints*," by permission of Messrs. Longmans.

dition may continue for minutes, hours, or days. It may spontaneously return to its normal position with a snap, and so again allow movement. It may require reduction. 3. Tenderness along the line of the cartilage. 4. Synovitis usually follows.

Treatment.—If the cartilage requires replacing, the manipulation is performed only by a surgeon. Subsequently the limb is kept at rest upon a back splint, and cooling lotions applied, until the inflammation subsides.

It is usual after a recurrence of the condition for the surgeon to operate and remove the injured cartilage.

If no operation is performed massage in the early stages

is useful to relieve pain and reduce swelling. Later it strengthens the muscles acting on the joint, and by improving their tone, and general condition, an over-stretching of the capsule and other ligaments is prevented. It is impossible to lay down a definite time for beginning massage. If the skin has become sodden by lotions, massage is delayed. If this is not the case, effleurage may be given between applications of lotion, as soon as the inflammation has subsided somewhat, say 24 or 48 hours after the injury.

Effleurage of the whole limb. First above the knee, then passing lightly over it, and after to the lower leg and foot. If the limb lies upon a back splint, this should not be disturbed for massage, only the bandages removed.

In 3 to 6 days, according to the severity of the case, gentle frictions round the knee may be added, and kneading of all the muscles, above and below the joint. In 6 to 8 days, add very careful passive movements of the knee-joint. At first this may be done in the same way as for a recently fractured patella. The patella must be manipulated. The strength of the massage must gradually increase.

If an operation is performed massage is delayed until the wound is healed.

After 3 to 4 weeks, full treatment is given. Effleurage of whole limb. Frictions of knee and ankle joints. Petrissage, hacking, and clapping of muscles above and below. Passive and active movements.

Injured knee-joints often come into the hands of the masseuse with less definite symptoms than those described above. The following sometimes occurs :—a small portion of synovial membrane becomes thickened and nipped in between the cartilage and bone, giving rise to some of the symptoms already described. Massage is ordered, and much the same course may be pursued as for a slipped semilunar cartilage.

STIFF JOINTS

Stiff joints frequently occur as the result of fractures, dislocations, sepsis, rheumatism, and gout. Each of these conditions is dealt with separately in this book and needs careful study by the masseuse. Many stiff joints are caused

by adhesions, due to exudations into the tissues, and matting of the parts surrounding the joint. Frictions and passive movements are the manipulations most suited to the treatment of such conditions. Often they cannot be administered without some degree of pain to the patient, but the frictions should begin gently, and gradually increase in strength, and passive movements should be done in small excursions and gradually be made larger. If these principles are carried out, less pain is caused than when frictions are suddenly deep and the movements forced. A stiff joint should be coaxed back to its normal state rather than forced. Soothing effleurage, petrissage of the muscles, and strong tapotement are also necessary for these cases.

Sometimes the surgeon advises forcible breaking down of adhesions under an anæsthetic. This he does himself. The joint is tender and sore after, but the massage may be resumed the following day, to soothe the pain and prevent adhesions re-forming.

Massage is frequently ordered after septic conditions. The neighbouring joints are stiff, and the tissues hardened. There are frequently scars of injuries, also of incisions which have been made by the surgeon during treatment in the earlier stages. Such cases require persistent massage, the performance of which can only be learnt by practice. Again frictions and passive movements will be found the most suitable.

Massage is of no avail when joints become ankylosed as the result of bony changes.

VOLKMANN'S ISCHÆMIC PARALYSIS AND CONTRACTURE

Volkman's ischæmic contracture is a serious condition seen usually in the forearm and hand, as a result of over-constriction of the limb. It generally occurs in children after some injury, *e.g.* fracture of the humerus, when splints and bandages have been applied too tightly.

Ischæma means a deficiency of blood, and Volkmann considered the condition to be due to diminished arterial supply and consequent lack of oxygen. There is also venous stasis

causing exudation into and between the muscle fibres. These changes result in a breaking down of the muscle protoplasm and paralysis due to pressure on the nerves, the part becoming rapidly contracted. The blood supply is not completely cut off, else gangrene would ensue, but the condition is somewhat like that of rigor mortis.

The signs of ischæmic contracture come on rapidly when bandages are too tightly applied. There is pain, the parts swell and become discoloured, and in about 24 hours the hand assumes the claw-shape. Generally the flexor muscles on the ulnar side are affected the most. Eventually the elbow is flexed, the forearm pronated, the wrist flexed, and the fingers clawed.

Treatment.—This should be preventive. In all injuries, bandages, dressings, etc., must be so applied that they do not over-constrict the part. If the signs described above appear, bandages should be removed, the injury be carefully fixed, and effleurage and passive movements applied. If treatment is necessary later, the part should be bathed in hot water twice daily, and then carefully massaged with effleurage, frictions, and passive movements. Special attention must be paid to the contractions.

CHAPTER XII

DEFORMITIES:—Torticollis or wry-neck—Cervical rib—The normal spine—Curvature of the spine—Scoliosis—Kyphosis—Lordosis—Deformities of the upper extremity—Sprengel's shoulder—Congenital contraction of the fingers—Dupuytren's contraction—Deformities of the lower extremity—Coxa vara—Knock knees or Genu valgum—Bow legs or Genu varum—The foot—Flat foot—Trench foot—Talipes or club foot.

WRY-NECK OR TORTICOLLIS

“TORTICOLLIS is a deformity, either congenital or acquired, characterised by lateral inclination of the head to the shoulder, with torsion of the neck and deviation of the face” (*Tubby*). The sterno-mastoid muscle is contracted on one side and stretched on the other. Sometimes other neck muscles are involved, viz. trapezius, splenius, and the scaleni.

Congenital Torticollis.—This condition arises from faulty development of the muscles before birth, or from contraction due to injury during labour.

Signs.—The head is drawn down to one side, the face is rotated to the opposite side of the contraction, and the chin raised. In some cases the face on the side of the contraction is smaller and less developed. The sterno-mastoid on the opposite side of the contraction is stretched and weak, and hardened swellings may sometimes be felt in it. In cases of long standing, cervical curvature may appear, owing to the fixed abnormal position. The contracted muscle is often replaced by fibrous tissue, which has no elasticity. The tissue is sometimes found to contain a hardened blood clot (hæmatoma), but this condition does not seem to bear any relation to the contraction.

Acquired Torticollis.—“This may be a mere passing condition due to muscular rheumatism brought on by exposure



FIG. 37.—CONGENITAL TORTICOLLIS BEFORE SURGICAL
TREATMENT



FIG. 38.—THE SAME PATIENT AS FIG. 37 AFTER SURGICAL
TREATMENT. IT IS AT THIS STAGE THAT MASSAGE AND GYMNASTICS ARE BENEFICIAL

From photographs lent by Mr. Blundell Bankart.

to cold, and under the name of stiff neck is familiar to everybody" (*Poore*).

The following conditions may cause the head to be held in an abnormal position resembling torticollis: (a) Cervical caries of spine; (b) infantile paralysis; (c) abscess in the glands of the neck. In the latter case, the head is drawn down to the same side as the abscess.

Spasmodic Torticollis.—This is a serious variety, brought about by an irritable condition of the spinal accessory nerve. There is intermittent spasm in the muscles on one side of the neck, which causes the head to be jerked in the opposite direction.

Hysteria is sometimes the cause of torticollis.

Treatment of Congenital Torticollis.—Very slight cases may be cured by massage and movements, but the majority first require surgical treatment. The contracted muscle is divided and stretched. The incision is usually made transversely $\frac{1}{2}$ inch above the clavicular attachment of the muscle. As soon as the wound is healed and stitches removed massage and movements may begin.

Massage of muscles on back of neck. Effleurage, kneading, petrissage, frictions, hacking. (A detailed account of suitable positions and manipulations is given on p. 31.)

Massage of sterno-mastoid muscles. The patient sits upright, the masseuse supports the head. For the stretched muscle:—Effleurage, petrissage, frictions, hacking. For the contracted muscle:—Effleurage, frictions, stretching the muscle during the manipulations. Effleurage with both hands on the front of the neck.

Movements.—Position of patient: (a) Lying, the head over the end of the plinth, and supported by the masseuse. (b) Sitting, the hands firmly grasping a support to fix the shoulders.

Head rolling in both directions. 10 to 20 times.

Active head bending backwards, concentrically and eccentrically in the inner range. 5 to 10 times.

Active head side flexion, away from the contracted muscle, concentrically and eccentrically in the inner range. 5 to 10 times.

Active head side turning, towards the side of the contracted muscle, concentrically and eccentrically in the inner range. 5 to 10 times.

Note. At the end of each movement the patient should try to hold his head in the corrected position without support.

Head suspension. This can only be done with an appliance made for the purpose. A hook must be securely fixed to a beam in the ceiling, and the apparatus suspended from it.

Some surgeons advocate the wearing of an appliance between treatment, to correct the position of the head.

Treatment of Acquired Torticollis.—A temporary condition of torticollis, due to muscular rheumatism, may be quickly relieved and cured by massage. (See treatment of "Rheumatism," p. 160.)

Treatment of Spasmodic Torticollis.—Massage, if ordered, must be of a soothing nature. Effleurage, vibrations, gentle kneading, and friction. Head and neck movements may be helpful when given freely, the patient obeying the masseuse's commands. Later they should be practised before a looking-glass.

In hysterical forms, massage and movements may be helpful, when combined with suggestive treatment.

CERVICAL RIB

This occurs when the anterior root of the transverse process of the seventh cervical vertebra exists as a separate bone. A similar growth sometimes occurs from the sixth cervical vertebra.

In early life the rib is composed of cartilage, but later it becomes ossified. It passes down behind the nerves towards the first rib. In many cases it causes no inconvenience, but it may increase in size, and press upon the roots of the brachial plexus, or push forward the sub-clavian vessels, giving rise to nervous or vascular disturbances. There may be weakness, or loss of power of the arm, neuralgia or neuritis. Such pressure symptoms sometimes call for surgical treatment, when the rib is removed.

Treatment by Massage.—This may be ordered if operation is undesirable, or after it has taken place. In either case the whole arm and shoulder should be treated with effleurage muscle kneading, hacking, and clapping, passive and active movements. If neuralgia or neuritis is present, nerve treatment must be given. Vibrations with the whole hand over the brachial plexus, and down the arm, also running vibrations on the affected nerves and much effleurage. If this soothing treatment is required tapotement is omitted.

THE NORMAL SPINE

“The spinal column is a flexible structure formed of separate pieces (the vertebræ), which are severally united by discs of fibro-cartilage, bound together by numerous and strong ligaments, and surrounded and acted upon by powerful muscles” (*Brodhurst*).

The spinal column has many important functions. It supports the head, and protects the spinal cord. It supports the ribs, and together with them forms the thorax. It supports certain organs, which may be said to hang upon the spine. Owing to its structure, it acts like a spiral spring, and so prevents shocks to the brain and spinal cord.

“The spine in the foetus is bent forwards, its curve being moulded to the walls of the uterus. The head is bent upon the breast. In the infant the spine remains almost straight while in the horizontal position. The sacrum is only slightly curved” (*Brodhurst*).

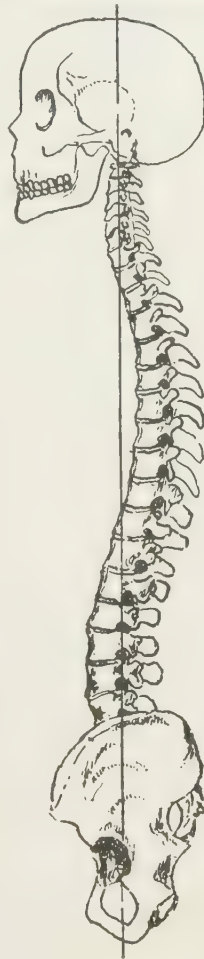


FIG. 39.—LATERAL VIEW OF NORMAL SPINE.
After Brodhurst.

A healthy baby begins to sit up at from 7 to 9 months old. He sits with his legs outstretched, and his back remains rounded and the head bent forwards. By degrees the strong neck muscles lift the head, and so enable the child to look straight in front of him. When he begins to walk at from 12 to 18 months old, the normal curves clearly seen in the adult begin to develop, but there are no fixed curves before seven years of age. These curves, which are in an antero-posterior direction, are developed very slowly, and depend in a great measure on muscular action, and on the erect position which human beings are destined to assume.

The spine bends forwards in the cervical and lumbar regions, and backwards in the dorsal and sacral regions. When the curves have appeared the spine loses some of its flexibility. There is considerable movement in the cervical and lumbar regions, but very little in the dorsal.

CURVATURE OF THE SPINE

There are four forms of curvature, viz:—

Scoliosis or lateral curvature.

Kyphosis or posterior curvature (increase of the normal curve backwards).

Angular curvature, which is hump-back, caused by disease in the vertebral column.

Lordosis, or anterior curvature (increase of the normal curve forwards in the lumbar region).

SCOLIOSIS

Scoliosis means twisting. It is a lateral bending of the spine combined with rotation or twisting of the vertebral bodies towards the same side as the convexity of the curve.

Varieties of Scoliosis.—The curve is called cervical, dorsal, or lumbar according to its position, and right or left according to the side of the convexity of the curve. A single or C-shaped curve is one where the spine deviates to one side only. It is also known as total scoliosis. A double or S-shaped curve

is one in which the spine deviates to the right in one region and to the left in another. Sometimes a triple curve is seen.

In any of these varieties changes take place in muscles, ligaments, cartilages, and bones. The muscles and ligaments become stretched and weak on the convex side of the curve, contracted on the concave side. In severe cases the bodies



FIG. 40.—POSTERIOR VIEW.



FIG. 41.—ANTERIOR VIEW.

SCOLIOSIS, SHOWING ROTATION OF THE VERTEBRÆ.

After Brodhurst.

of the vertebræ and the inter-vertebral discs become wedge-shaped.

Some Causes of Scoliosis.—Muscular weakness, combined with an habitual faulty position when standing, sitting, or lying. Unequal length of legs ; this causes a faulty position

to be continually assumed, and produces a condition known as static scoliosis. Defective eyesight. Rickets. Infantile paralysis. Pleurisy. One-sided occupations, *e.g.* violin playing, ironing, etc.

Cause of the Rotation of the Vertebral Bodies.—This is probably due partly to the side flexion. The bodies twist to the side of the convexity of the curve, because there is more room for them there. They are also acted upon by the weight of the body from above, and by the resistance of the floor below.

Signs of a Lumbar Curve. Deviation of the spine to the



FIG. 42.—DIAGRAM SHOWING SECTION OF THE THORAX IN RIGHT-DORSAL CONVEX SCOLIOSIS.

Copied by permission of Mr. Jackson Clarke.

right or left. The hips may be uneven. The waist angle is probably sharper on the concave side. The side of the back is broader on the concave side. If there is rotation of the vertebræ, the muscles will protrude backwards, on the side of the convexity.

Signs of a Dorsal Curve.—Deviation of the spine to the right or left. The scapulæ are uneven in height and may protrude backwards. The height of the shoulders is uneven (generally that on the convex side is higher). The angles of the ribs are altered. Back view: they protrude backwards on the side of the convexity; they are flattened on the side

of the concavity. Front view: they protrude forwards on the side of the concavity, and are flattened on the side of the convexity.

Signs of a Cervical Curve.—Deviation of the spine to the right or left. The position of the head is altered. The



FIG. 43.—RIGHT DORSAL SCOLIOSIS.

From a photograph lent by Mr. Golding-Bird.

neck lines are uneven. One sterno-mastoid muscle may be contracted.

How to examine Scoliosis.—The patient must be undressed to the level of the trochanters of the femurs, and the clothes fixed firmly with a strap. The chest should be

covered, and the patient placed in a good light, standing with the feet slightly parted.

First examine the back view. Tell the patient to stand in her ordinary position (she will settle to this in a few seconds). Then notice the following points: The whole position of the body (it is often tilted to one side). The condition of the muscles. All the signs mentioned above according to the curve. Then let the patient curve the whole spine forwards as far as possible, allowing the arms to hang down. Examine the spine carefully. In this position the signs of rotation are most easily seen. Next tell the patient to stand in the best possible position she can assume, and note carefully any changes. Now let the patient hang by her hands on a bar. Many curves will straighten entirely when thus suspended, but if there are changes in the bones and the spine is very stiff, the deformity will still be seen.

Examine the front view and notice the following points: The whole position of the body. The level of the hips. The condition of the abdominal muscles. Whether the chest is contracted. The position of the head and the neck lines. Measure the length of the legs from the anterior superior spine to the external malleolus. Measure the distance from the anterior superior spine to the umbilicus to determine whether there is rotation of the pelvis.

Treatment.—The general hygienic conditions and the patient's habits must be regulated. The clothing must be warm, but should not restrict the patient in any way. A nourishing diet must be maintained. Plenty of fresh air and a proper amount of sleep are necessary. Rest, lying supine for from 1 to 3 hours, must form part of the daily programme. A firm couch or mattress should be used for this. The masseuse should take note whether the patient is sleeping in a suitable bed, and sitting in a proper position both during study and meals. A chair with a high back, that supports the whole spine and the head, is the best. A board placed on the chair forms a suitable substitute for the high back.

Exercises should be performed daily, and their aim is to correct the deformity by stretching the ligaments and muscles on the contracted side, and strengthening them on the

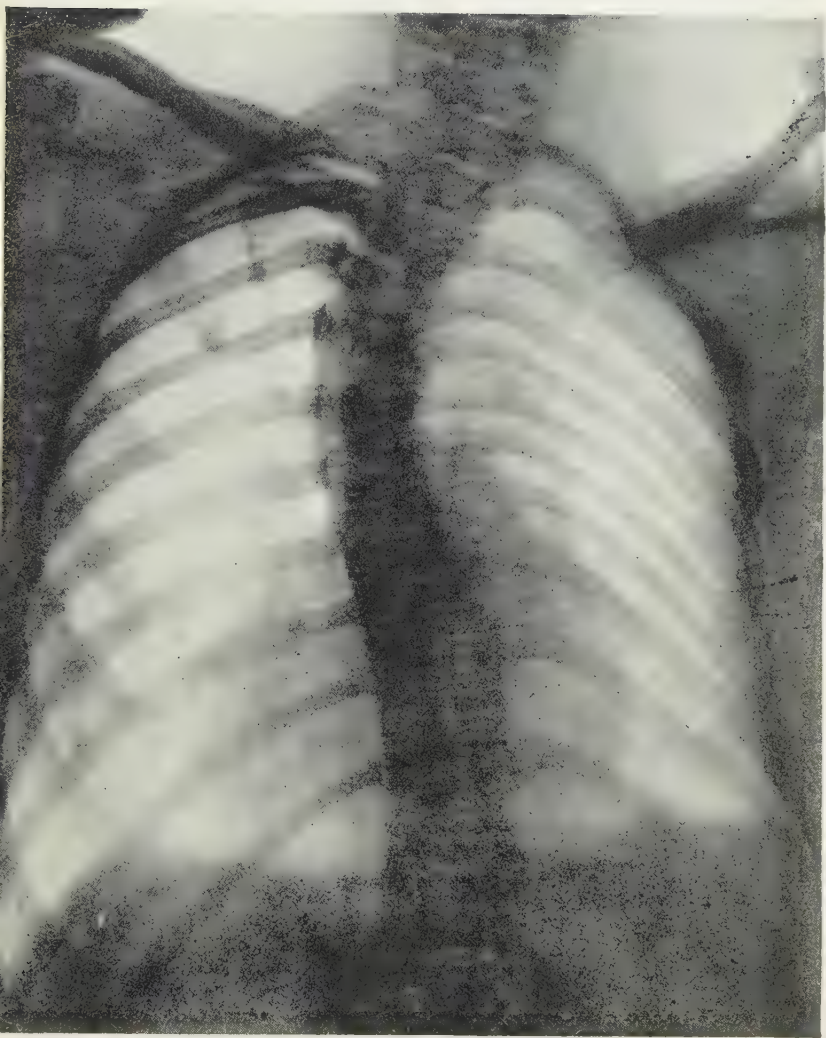


FIG. 43a.—SKIAGRAM IN A CASE OF MARKED SCOLIOSIS, SHOWING ROTATION OF THE VERTEBRÆ, AND ATROPHY OF THE RIBS ON THE CONCAVE SIDE RESULTING FROM FUNCTIONAL DISUSE.

From a photograph lent by Dr. Stanley Melville.

stretched convex side. Other important points are to expand the chest, and increase mobility of the spine. To improve the condition of all the back muscles, and to give general exercises for all muscle groups. The exercises must be chosen and arranged according to the age and condition of the patient. They should be performed for from 20 to 40 minutes daily, and should be followed by 10 to 20 minutes' back massage and then rest.

In some cases it is also suitable to massage the chest.

Back Massage for Scoliosis.—The patient lies prone, and all garments should be loose to the level of the great trochanters. The masseuse stands at the side, and massage is given as already described, except that special attention must be paid to the following points:—

Extra kneadings and frictions are necessary over the convexities of the curve. Tapotement is given only on the convexities. If performed on the concavities it tends to increase their contractions. The lumbar and gluteal regions require treatment, even if the dorsal region is the seat of the curve.

If the deformity is very slight, the two sides of the spine may be massaged alike with all manipulations.



FIG. 44.—SCOLIOSIS.

From "*Orthopædic Surgery*," by J. Jackson Clarke, F.R.C.S. (Cassell).

A SPECIMEN TABLE OF EXERCISES

(For a girl of fourteen with slight right dorsal,
left lumbar scoliosis)

1. Lying, deep breathing and arm raising to shoulder height. 6 times.
2. Lying, alternate knee lifting. 12 times.
3. Lying, arm extension, upwards and outwards. 12 times.

4. Wing stride standing, trunk rolling. 8 times each way.
 5. Deep breathing and arm raising. 6 times.
 6. Hanging. 3 times, 3 deep breathings between each.
 7. Wing stride sitting, trunk raising. After each raising the patient is instructed to hold in the corrected position, while 12 is counted. 6 times.
 8. Sitting chest lifting. 6 times.
 9. Hands behind the neck, chest expansion. 6 times.
 10. Wing close sitting, alternate trunk turning. 6 times each way.
 11. Hanging and head bending backwards, and raising. The hanging to be done 3 times, 3 deep breathings between each. The head backwards bending to be done 3 times during each hanging.
 12. Wing leg forward lying, holding. 3 times.
 13. Standing, hands grasping a bar, heel raising and knee bending. 8 times.
 14. Standing, hands placed horizontally across the chest. Arm casting. 18 times.
 15. Lying, deep breathing and arm raising. 6 times.
- Back massage, lying in a corrected position, with the left arm raised above the head, and the right lying close to the side.

Hanging bar for private house.—An oval-shaped bar 3 ft. long, 2 to 2½ in. deep. A board about 1 in. thick into which are fixed two strong brackets to support bar. Bar must be so placed in brackets that it is 4 in. from board. The board must be fixed securely to the wall, at such a height that patient's feet are off the ground when hanging.

Head-suspension Apparatus.—As for torticollis.

KYPHOSIS

Kyphosis is an increase of the normal curve backwards in the dorsal region. It is generally combined with round shoulders and a contracted chest.

The muscles and ligaments on the posterior surface of the body become stretched and weak; on the anterior they tend to contract.

Some Causes of Kyphosis.—General weakness and debility. Bad eyesight. Softening of bone caused by rickets. Slouching habits. Stooping occupations. Old age.

The patient should be examined as for scoliosis, and the following points noticed, after telling the patient to assume his ordinary position :—

Back view : The extent of the kyphosis, the position of the head, the position of the scapulæ, the condition of the muscles, and any deformity of the ribs.

Front view : The extent of the chest contraction, the position of the head, the condition of the muscles including those of the abdomen.

Lateral view : The position of the head and shoulders, and whether the abdomen protrudes.

After telling the patient to assume the best possible position, improvement by treatment may be expected according to the amount of correction possible by the patient's own effort.

Treatment.—General hygienic conditions must be considered as for scoliosis. Special attention should be paid to the clothes, that the patient is not restricted in any way. Plenty of room should be allowed for chest expansion. If the eyesight is faulty, the eyes should be examined. Details of position during ordinary occupations are important.

Exercises should be performed daily. Their aim is to correct the deformity by strengthening muscles on the posterior surface of the body, and stretching them on the anterior. The following may be used :—Hanging, all movements to increase mobility of the spine, active exercises for arm and



FIG. 45.—GIRL AGED TWELVE, SHOWING MARKED THORACIC KYPHOSIS.

From "*Orthopædic Surgery*," by J. Jackson Clarke, F.R.C.S. (Cassell).

back shoulder muscles, chest expansion, active movements to strengthen all the back muscles and to correct the position of the head.

Back massage should be given. The two sides of the spine require equal stimulation, and all manipulations may be applied.

LORDOSIS

Lordosis is an increase of the normal curve forwards in the lumbar region. The muscles and ligaments on the anterior side of the body become stretched and weak, those on the posterior contracted. Lordosis is rarely seen alone, it is generally described as a symptom of some other condition, viz. with congenital dislocation of the hips; as a compensating curve to kyphosis; as the result of rickets.

The patient should be examined as for kyphosis; the lordosis is best seen in the lateral view. The abdomen protrudes, owing to muscle weakness.

Treatment.—If the condition is caused by congenital dislocation of the hips, gymnastic treatment is useless, but if from other causes, improvement may be gained by the following:—Correct the position of standing. Give passive stretchings of the spine—movements which carry the trunk in a forwards and downwards direction, also those which actively work the abdominal muscles. The following may be used:—Hanging, crook sitting holding, wing stride sitting back raising,



FIG. 46. — LORDOSIS.
*From a photograph lent by
Mr. Jackson Clarke.*

stretch stride standing forward and downwards bending, hewing, sawing, lying double leg flexion, lying double leg

lifting (carrying the legs well over), general corrective position, and long sitting touch toes.

A SPECIMEN TABLE OF EXERCISES

(For a girl of sixteen with kyphosis and lordosis)

1. Lying, deep breathing and arms raising sideways. 6 times.
2. Grasp lying, double leg flexion. 6 times.
3. Standing, back supported at a corner from sacrum to head, arm casting. 12 times.
4. Standing, feet well parted, hewing. 8 times.
5. Hanging. 3 times.
6. Wing stretch sitting, back raising. 6 times.
7. Sitting, chest expansion. 6 times.
8. Sitting, chest lifting. 6 times.
9. Crook sitting holding, cushion between shoulders and support, hands stretched up grasping a bar.
10. Standing, feet well parted, sawing. 4 times.
11. Wing standing, alternate knee lifting. 12 times.
12. Hanging and head bending backwards. 3 times.
13. Wing leg forward lying, holding. Twice.
14. Standing, back supported at a corner, double plane arm carrying. 8 times.
15. Lying, double leg lifting. 6 times.
16. Lying deep breathing. 6 times.

ANGULAR CURVATURE OR HUMP-BACK

Angular curvature and its treatment have already been given in the chapter upon tubercular inflammation of bone.

SPRENGEL'S SHOULDER

Sprengel's shoulder is a congenital elevation of the scapula. The bone is situated above its proper position and is somewhat rotated, and so a deformity arises. The lower part of trapezius and serratus magnus is often defective, but the muscles attached to the upper border of the bone are prominent. The arm on the affected side is usually smaller than its fellow, and scoliosis develops.

The condition is said to be due to abnormal uterine pressure.

Treatment.—The muscles may require surgical treatment, otherwise aim at improving the general health, and correcting the scoliosis, specially treating weak and atrophied muscles. If the arm is small, give massage and movements to improve its nutrition and circulation.

CONGENITAL CONTRACTION OF THE FINGERS

This is due to contraction of the central prolongation of the palmar fascia of the fingers. The little finger is the one usually affected.

Treatment.—Surgical methods are sometimes necessary. But good results may be obtained by the use of a splint, and persistent massage and stretching movements.

DUPUYTREN'S CONTRACTURE

Dupuytren's contracture is a condition caused by contraction of the palmar fascia within the palm, and resulting in a flexion of the first and second phalanges of the fingers.



FIG. 47.—DUPUYTREN'S CONTRACTURE.

By permission, from Rose & Carless's "Manual of Surgery" (Baillière, Tindall & Cox, London).

It is usually seen in middle-aged men with gouty tendencies. Sometimes it seems brought on by the constant use of some tool such as an awl, but it may appear without this. It is due to a chronic overgrowth of the palmar fascia. It begins

as a nodule beneath the skin, and generally affects first the ring and little fingers. These are gradually drawn down into the palm, and extension becomes impossible. Sometimes the other fingers and thumb are involved.

Treatment.—This is surgical. The surgeon divides the fascia and straightens the fingers. As soon as the wound is healed, massage may begin; friction and passive movements being very helpful in restoring the hand to its normal state.

DEFORMITIES OF THE LOWER EXTREMITY

COXA VARA

The neck of the femur is that part of the bone which connects the head with the shaft. It forms an angle which is wide in infancy, but gradually decreases. In the adult, this angle is normally one of about 125° .

In the condition known as coxa vara the angle becomes changed. Instead of sloping obliquely upwards from the shaft, it becomes horizontal, and in bad cases is directed downwards.

This condition is seen in young children who have suffered from rickets, also in adolescents, where it may be the result of the same disease. It is, however, most frequently seen in young people who have had to walk much or carry heavy weights. Sometimes it occurs after a fracture of the neck of the femur in a child. It is then probably due to a yielding of the callus; it may also be caused by a gradual slipping down of the epiphysis of the bone.

There is characteristic deformity, with shortening of the limb. The patient walks with a limp. The trochanter is prominent, especially when the hip is flexed. The movements of the joint are limited, especially internal rotation and abduction. During flexion, the limb sometimes lies across the sound one. In bad cases if both joints are affected, a scissor-legged condition may be the result of the extreme adduction. Walking then becomes almost impossible.

Treatment.—In the early stages rest is very important. Massage and movements of the limbs may be ordered to

keep up the nutrition and tone of the muscles and mobility of joints. All manipulations for the lower extremities may be given, together with careful passive (and active) movements in all the joints.

Surgical treatment is resorted to in extreme cases. A wedge-shaped portion of bone is removed from the shaft below the trochanters, in order to alter the axis of the bone. When this is done, and the process of healing has taken place, massage may again be ordered for the same reasons as above. No hip movements should be given for from 4 to 6 weeks, and when allowed must be done with great caution.

The subsequent shortening of the limb may be corrected by wearing a thick sole on the boot.

KNOCK KNEES OR GENU VALGUM

Genu valgum is a deformity of the knees. The internal condyles of the femur become enlarged, the legs are held in the position of abduction, combined with some external rotation. One or both legs may be affected. "In the erect posture, the femur is set at an angle to the tibia (which is vertical) in such a way that the weight of the trunk, transmitted in a vertical line from the head of the femur to the ground, passes through the outer condyle" (*Rose and Carlless*). This causes the inner condyle of the femur to be lengthened, in order to keep the knee-joint horizontal. This position throws a certain amount of strain and tension on the internal lateral ligaments. In genu valgum the bones increase rapidly in size, without the ligaments and muscles gaining a corresponding strength. The internal lateral ligament becomes more and more stretched, the external condyle becomes compressed, owing to increased weight, and the internal condyle enlarges. The condition is often associated with flat foot and spinal curvature.

Causes.—In adolescents it is generally caused by much standing and walking, and by carrying heavy weights. In young children it is due to rickets. There is a traumatic form; it may occur after fracture of the femur or tibia, close to the joint, or after a lateral dislocation of the knee.

The following points require special notice :—

1. Prominence on the inner side of one or both knees. This can be seen and felt.

2. The aspect of the legs when the patient stands : (a) with heels together—note, one knee falls in front of the other, the hip and knee being flexed ; (b) with the knees just touching—note how far the ankles are apart.

3. The position of the patella. It may appear to be displaced outwards. This is due to the fact that it lies within the tendon of the quadriceps muscle. This muscle is kept in a straight line from its origin on the anterior superior spine of the ilium to the tubercle of the tibia. Owing to the enlargement of the joint on the inner side, the patella appears to be pushed out.

4. The following structures should be felt : the tendon of biceps, the external lateral ligament of the knee, and the ilio-tibial band, which may be tense and contracted.

Treatment.—If the deformity is due to rickets, the general condition of the patient must be considered. The child should be kept entirely off his feet. Sometimes splints are applied.

Massage, using oil as a lubricant, and passive movements are useful, together with such manipulations and pressure as will help to straighten the limb. In older patients full massage of the lower extremities may be given with passive and active movements. In applying flexion in the hip and knee it may be given with concentric and eccentric muscle work, and during the movement the knee is guided in an outward direction all the time. The patient draws up the knee while the masseuse resists ; the masseuse, after giving some extra pressure against the shoulder, presses the knee back to the starting position, while the patient resists. 3 to 6 times.

Pressure may also be given with one hand on the inner condyle of the femur, and with the outer hand on the external malleolus.

BOW LEGS, OR GENU VARUM

Genu varum is not so common as genu valgum, and it is an opposite condition, *i.e.* the external condyles become

enlarged, and the internal compressed. The legs are bowed outwards.

If treatment is required, its aims are the same as those described above, except that the outer side of the knees and legs must be strengthened instead of the inner, and the pressure and manipulations also applied to the external condyles.

THE FOOT

The bones of the foot are so arranged as to form a series of arches, which enable it to support the body in the erect position, with the least expenditure of force. The arches are formed by the tarsal and metatarsal bones, these being strengthened by the ligaments and muscles of the foot.

There are arches in the antero-posterior and transverse directions.

The Antero-posterior Arch.—Its posterior extremity is os calcis; the anterior extremity is the heads of the three metatarsal bones. Owing to its height, and the number of small bones of which it is composed, this arch is very elastic. Its weakest point is where astragalus articulates with the scaphoid. It is here, however, supported on its under surface by the inferior calcaneo-scaphoid ligament, which contains a considerable amount of elastic fibres, and hence has been called the “spring ligament.” The inferior calcaneo-scaphoid ligament is further strengthened by the internal lateral ligament of the ankle, the tendon of the tibialis posticus muscle, the plantar fascia, the tendons of tibialis anticus and peroneus longus, and the small muscles on the sole of the foot.

The Transverse Arch.—Across the middle of the tarsus the bones of each foot form half a dome, so that when the inner borders of the feet are placed together a complete dome may be seen.

A child is born without an arch to his foot. In his early years, the sole of the foot has a pad of fat within it, which gives the appearance of flat foot, but it is better described as “fat foot.” It is not until the child begins to walk that the arches develop.

FLAT FOOT

Flat foot is a condition caused by sinking of the arches combined with eversion of the foot. The acquired type of flat foot is seen in young adults, whose occupations have caused them much standing, walking, or the carrying of heavy weights. Flat foot occurs when these conditions are



FIG. 48.—THE FEET OF A GIRL AGED FOURTEEN YEARS. THE LEFT FOOT SHOWS AN EXTREME DEGREE OF FLAT FOOT.

From "Orthopædic Surgery," by J. Jackson Clarke, F.R.C.S. (Cassell).

combined with rapid growth and poor general nutrition. Other causes are anæmia, rickets, and rheumatism.

The following changes occur :—

Lowering of the arches, combined with eversion of the foot. The supporting ligaments, fasciæ, muscles, and tendons become stretched and weak. In severe cases there are bony changes, viz. a lengthening of the neck of astragalus ; the head of astragalus and scaphoid become prominent.

The following important points should be noticed :—

1. The patient's method of walking, with and without boots.
2. Whether pain is present, and to what degree.
3. The patient standing with feet parallel, notice, from the front—the antero-posterior and transverse arches, the prominence of the head of astragalus, the inner malleolus, and scaphoid.

Notice, from the back —the prominence of the inner malleolus, also whether tendo achilles is displaced outwards.

4. Take an impression of the sole of the foot by wetting or greasing.

5. Tell the patient to stand on tip-toes. Notice if the arch is improved thereby, and how steadily he can stand.



FIG. 48a.—FOOTPRINT OF AN AVERAGE FOOT.

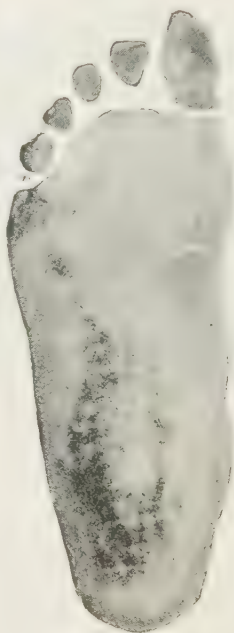


FIG. 49.—FOOTPRINT OF AN AVERAGE CASE OF FLAT FOOT.



FIG. 50.—FOOTPRINT OF AN EXTREME CASE OF FLAT FOOT.

From "Orthopædic Surgery," by J. Jackson Clarke, F.R.C.S. (Cassell).

6. Tell the patient to stand on the outer borders of the feet, and likewise note the result.

7. The patient sitting, with the foot supported. Feel for all the tender points; these will often occur on the sole and the dorsum of the foot, and round the malleoli. Notice if the patient complains of pain and aching of the calf muscles,

also over the region of the internal lateral ligament of the knee, which may be stretched and weak.

8. Try all passive and active movements.

Degrees of severity in Flat Foot.—There are three.

First degree. The patient can himself correct the deformity.

Second degree. Active correction on the part of the patient is not possible, but this may be done by an operator. The foot is grasped in the hand, and the arch forced up.

Third degree. No correction is possible.

Treatment.—Rest is a very important factor, and should be enforced as much as possible. In severe cases operative treatment is necessary. Some surgeons advocate encasing the feet in plaster of Paris, after wrenching under an anæsthetic. A variety of pads, and special boots are ordered by the surgeon.

Massage and exercises should be given as follows:—

Positions.—For the patient, (a) Lying; the masseuse sits or stands at the side. (b) Sitting; the masseuse sits rather lower, in front and to the outer side of the foot treated.

Effleurage, with both hands on the dorsal and plantar surface of the foot, up each side over the malleoli, up each side of tendo-achilles, and extra on the plantar surface of the foot with one hand. Kneading of the dorsal and plantar surfaces. Frictions round the malleoli, across the front of the joint, on each side of tendo-achilles, down the inner border of the foot, and on the plantar surface.

Hacking and clapping (if the foot is not too tender), effleurage, petrissage, and tapotement of the calf muscles.

Movements.—Foot rolling, inwards only (carry the foot down and in). 10 to 20 times.

Active foot flexion and extension. 6 to 12 times.

Active inversion. Muscles working concentrically and eccentrically in the inner range. The patient inverts the foot; the masseuse passively increases the movement, and then carries the foot back to the mid-line while the patient resists. 6 to 12 times.

Time for massage and movements, 15 to 25 minutes each foot and leg.

(For free exercises for flat foot see page 70.)

TALIPES OR CLUB FOOT

"The term Club Foot comprises those deformities in which the anatomical relations of the foot to the leg, or one part of the foot to the other, are abnormal" (*Tubby*).

The condition is associated with the loss of action or over-



FIG. 51.—LEGS AND FEET OF A GIRL AGED SEVEN YEARS, SHOWING MARKED PARALYTIC EQUINUS AND TWO INCHES OF SHORTENING ON THE LEFT SIDE.

From "Orthopædic Surgery," by J. Jackson Clarke, F.R.C.S. (Cassell).



FIG. 52.— CONGENITAL TALIPES EQUINO-VARUS IN A BOY AGED NINE.

From "Orthopædic Surgery," by J. Jackson Clarke, F.R.C.S. (Cassell).

action of one or more groups of muscles concerned in the movements of the foot.

Club foot may be (a) congenital, when the supposed cause is malposition in the uterus. It is more common in boys than in girls, and is often hereditary. (b) Acquired, when the deformity is the result of paralysis or injury. Acute anterior poliomyelitis is a common cause.

FORMS OF TALIPES

- Equinus*.—The heel is drawn up, the patient walks on the toes, *i.e.* the foot is plantar-flexed. } The centre of movement is chiefly at the ankle-joint.
- Calcaneus*.—The heel is on the ground and the toes are raised, *i.e.* the foot is dorsi-flexed. }
- Varus*.—The inner side of the foot is raised, the patient walks on the outer border, also the foot is inverted or supinated. } The centre of movement is at the ankle and medio-tarsal joints.
- Valgus*.—This form is due to a yielding of the longitudinal arch on the inner side of the foot. The foot is everted or pronated. }
- Pes Cavus*.—The convexity of the longitudinal arch of the foot is increased.

The first four types may be combined with each other in the following ways:—

Equino-varus. Very common.

Calcaneo-valgus.

Equino-valgus } Uncommon.

Calcaneo-varus. }

Treatment.—In congenital cases the early treatment is in the hands of the surgeon. Tenotomy is often necessary, and should be performed as soon as possible. The feet are then bandaged on to a well-padded malleable iron splint, which must be removed daily for careful and persistent manipulations. The child should be placed on a table, and the operator seated in front.

The feet are manipulated according to the deformity with strong passive movements 10 minutes each foot once or twice daily.

For varus: Grasp the (R) lower leg and heel with (L) hand, manipulate with (R) hand, pressing the foot outwards.

For valgus: *vice versa*.

For equinus: Grasp the (R) lower leg and heel with (L) hand, dorsi flex the foot with (R) hand.

For Calcaneus :—*vice versa*.

Later the surgeon often orders a tin splint with a foot-piece. This keeps the foot in good position and the muscles relaxed. The splint is removed daily for treatment.

These cases may vary from muscular weakness with no deformity, to those where extensive surgical treatment has been necessary. In all the masseuse must aim at strengthening weak stretched muscles, and stretching contracted ones. Frictions of the ankle-joint and foot are given, with petrissage of the calf muscles.

Movements.—Rolling for a varus foot should be done down and outwards only ; for a valgus foot down and inwards only.

Flexion and extension, inversion and eversion are given according to the deformity. Active movements with concentric and eccentric muscle work should be used as soon as possible.

Treatment of talipes caused by paralysis must follow the same lines as given above, but tendons must be stretched with caution, and less force used than in congenital cases. It is easy to over-stretch the tendons of paralysed muscles, also those upon which an operation has been performed : *e.g.* a tendo-achilles may be lengthened by the surgeon to overcome equinus ; faulty manipulation may bring the foot into a calcaneous position.

PART III

MEDICAL CONDITIONS TREATED BY MASSAGE, WITH DETAILS OF APPLICATION

CHAPTER XIII

Constipation—Dyspepsia or Indigestion—Gastritis—Acute—Sub-acute
—Chronic—Dilatation of the stomach—Gastric ulcer—Enteritis
—Colitis—Appendicitis—Visceroptosis or Glénard's Disease—
Gastropptosis—Movable or floating kidney—Hæmorrhoids or piles.

CONSTIPATION

CONSTIPATION may be defined as infrequent and incomplete action of the bowels, combined with retention of the fæces within the colon, owing to their slow passage from the cæcum to the anus. The act of expelling the contents of the bowels is known as defæcation. It takes place due to muscular action, as the result of nervous stimulation. There are reflex nerve centres for the control of defæcation in the lumbar part of the spinal cord. The action is also influenced by impulses from the brain to certain voluntary muscles, which contract strongly and help in the act of expulsion.

In order that this important function may take place in a normal way it is necessary that gastric and intestinal juices and bile are produced in sufficient quantity, that the muscular walls of the abdomen, also those forming the intestinal coats, are in good condition, that peristalsis takes place, and that the blood supply by means of the portal circulation is good.

Persons in ordinary good health have an action of the bowels once daily. This, however, varies considerably. It may be increased or diminished, and yet normal health be maintained.

Interesting experiments have been made by Dr. Hertz and others, showing accurately the time which the contents of the lower bowel takes to pass from the cæcum to the rectum. The investigations are made by administering a bismuth meal, and watching its course by means of X-rays.

It is a well-known fact that food taken, or sometimes only thought of, will give stimulation to the lower bowel, increase peristaltic action and cause an evacuation which is the result of food taken some 12 hours previously.

Habits of regularity in childhood with regard to a daily evacuation of the bowels are of great importance. If the natural stimulus be frequently ignored, the patient is likely to suffer from chronic constipation, for "the sensibility of the nerves of the rectum become blunted by the constant contact of fæces, and the promptings of nature at last cease" (*Oliver and Edgecombe*).

Causes.—(a) Sedentary habits. This is a usual, but not an absolute cause, for constipation is often met with in people who lead an active life. (b) The continued use of purgative drugs. (c) The habitual disregard of the impulse to defæcate. (d) Errors in diet, *e.g.* too little vegetable food, too much meat, not enough liquid. (e) Certain nervous diseases—Melancholia, hysteria, all brain diseases, paralysis, etc. (f) Chlorosis, *i.e.* the anæmia of young girls. (g) Lead poisoning.

Symptoms.—These may vary from nothing to extreme illness. Some or all of the following may be present: The bowels act at irregular intervals. The rectum is loaded. There is ineffectual straining. Bad appetite, flatulence, foul tongue and breath, pain in the iliac region, piles, headache, and anæmia.

Treatment.—The cause should be removed as far as possible. Habits tending to produce constipation must be corrected. The patient should be told to attempt defæcation at the same hour daily. If there is difficulty and straining, a low seat should be used, or the feet raised by a foot-stool, in order to resemble the natural attitude as far as possible. Suitable exercise should be taken daily.

Diet, drugs, and general hygiene are regulated by the

doctor, but it is well known the following are beneficial in these cases:—A tumblerful of hot or cold water taken on waking, also during the day between meals, and at bedtime. Some animal food should be taken, and a good proportion of fresh vegetables and ripe fruit, also well-stewed fruit. Oils and fats should be taken in sufficient quantity, if they do not disturb the digestion. Coarse articles—*e.g.* bran or wheatmeal bread, oatmeal porridge, etc.

Treatment by Massage and Exercises.—This should be given daily, and it is often necessary to continue 2 to 3 months before a satisfactory result is reached.

Massage should take place as early in the day as possible, and never soon after a heavy meal. The bladder must be emptied before treatment. Continuous pain or tenderness during or after massage should be reported to the doctor.

The following may be used:—

Breathing exercises, leg rolling, sacral beating, trunk rolling, leg swinging, trunk bending forwards and sideways. The patient should be instructed to repeat the exercises in the evening.

Abdominal massage should include all manipulations for stomach and liver. Transverse stroking, and kneading. Circular kneading. Colon stroking, kneading and frictions. Lumbar side stroking and shaking. Cross abdominal shaking. Time for abdominal massage 15 to 30 minutes. Deep kneading and tapotement of the sacral and gluteal regions. The patient should take some nourishment, and rest for at least half an hour.

DYSPEPSIA OR INDIGESTION

Dyspepsia or indigestion may be defined as variable changes from the normal functions of any part of the digestive tract.

Such changes will speedily effect important processes in the body such as absorption of digested food and the elimination of waste products, and hence general metabolic changes will take place.

The causes are: (a) improper food; (b) changes in muscles of the alimentary canal; (c) changes in the digestive secretions.

Symptoms.—These may be very numerous. Some of the commonest are: constipation or diarrhœa, vomiting, flatulence, foul breath and tongue, eructations (*i.e.* expulsion of gas from the stomach upwards, sometimes with portions of liquid or solid food), changes in feeling which may vary from a feeling of weight or discomfort to severe pain, headache, giddiness, insomnia, impaired appetite, etc.

Treatment.—Removal of the cause, regulation of the diet, and general hygiene, will as before be in the doctor's hands.

General massage may be ordered to improve nutrition and circulation. Much effleurage and muscle kneading should be given. Passive movements and breathing exercises are also useful. Constipation should be treated by abdominal kneadings. Flatulence may be relieved by much stroking over the stomach. Gastric secretions may be increased and the walls of the stomach strengthened by stomach shakings and vibrations. The liver should be treated to improve its functions. If headache and insomnia are present, head, face, and back massage may give relief.

GASTRITIS

Acute Gastritis or gastric catarrh is "acute inflammation of the coats of the stomach, especially of the mucous membrane, resulting in a disturbance of function, and alteration of form" (*Gillespie*).

The causes of this condition are:—

Errors in diet, irritants, *e.g.* alcohol. Constitutional conditions, *e.g.* gout, rheumatism, and diabetes.

Symptoms.—Severe pain in the gastric region, a burning sensation, a feeling of weight in the stomach, tenderness on pressure. Intense nausea, and vomiting. The temperature rises, the skin is pale and cold, the patient is prostrated.

Treatment.—This is in the hands of the doctor. Massage is entirely contra-indicated.

Sub-acute Gastritis is "inflammation of the mucous membrane, less severe than in the acute form, of moderate duration and variable course" (*Gillespie*).

This condition is seen most commonly in women between

the ages of fifteen and thirty. It is often associated with anæmia. The causes may be the same as those of acute gastritis, but they occur more gradually. If treated wrongly or not at all, such cases will become chronic.

Symptoms.—Similar to those of acute gastritis, but less severe. There is epigastric pain and vomiting, flatulence and nausea, and a distaste for food, but there is not the complete prostration, and no rise of temperature. Many cases of so-called dyspepsia come under this heading of sub-acute gastritis.

The treatment is again in the hands of the doctor. Massage may be ordered for the improvement of general condition. Vigorous general massage may be given, with the exception of abdominal treatment, which is contra-indicated.

Chronic Gastritis.—"A chronic inflammatory affection of the various cellular elements in the gastric mucosa, leading to increase of connective tissue and loss of function" (*Gillespie*).

This chronic form often follows the acute and sub-acute attacks, but the condition may also occur as a result of repeated irritation of the mucous membrane by errors of diet, such as alcohol, strong condiments, an excess of tea, indigestible foods containing much cellulose, taking food too hot and at irregular times.

Symptoms.—Very variable. The following are among those commonly present:—Feelings of gastric weight and fullness after food. Flatulence, acidity, heart-burn, nausea and vomiting. Foul breath and tongue. Intestinal changes, *i.e.* constipation or diarrhœa. Lowering of the general nutrition, and sometimes nervous depression.

Treatment.—The diet must be carefully regulated. Harmful foods, *e.g.* highly seasoned, pickled, or smoked articles, must be avoided.

Massage may be given as for dyspepsia. Aim at improving general nutrition and helping the portal circulation. Abdominal massage must begin gradually, avoiding tender spots. Much soothing stroking over the stomach is useful.

DILATATION OF THE STOMACH

Dilatation of the stomach means an enlargement of the organ. It is generally combined with atony, *i.e.* a general want of tone in the muscle fibres.

The condition may be caused by some obstruction such as a tumour or by adhesions around the pylorus, or within the stomach as a result of ulceration.

Dilatation also occurs from excessive muscular weakness. This may be caused by much work being thrown on the stomach, *e.g.* large meals repeatedly taken for a long period. The condition is often found in patients suffering from neurasthenia, chronic gastritis, dyspepsia, and anæmia.

There are changes in nutrition when the stomach is dilated. There is diminished digestion and assimilation of food. The food remains long in the stomach and may undergo bacterial fermentation, whereby it is changed into substances which cannot nourish the body.

Symptoms.—Pain and discomfort in the region of the stomach. Flatulence and gaseous eructations. Vomiting often takes place 4 to 6 hours after food; it is preceded by pain and a burning sensation. The quantity brought up varies, but may be as much as 6 pints. Ejection of the contents of the stomach gives immediate relief.

Treatment.—The doctor often orders a systematic wash out of the stomach, by inserting a soft tube, and pouring in two or three pints of liquid containing some boric acid, bicarbonate of soda, etc. The diet must be carefully regulated. Large quantities of liquid must not be taken. Food must be fresh and digestible.

Massage is not given, if the condition is due to malignant disease, but otherwise general massage may be ordered to improve circulation and general nutrition; and abdominal massage is given, including special movements for the stomach—stroking, kneading, shaking, and vibrations.

GASTRIC ULCER

“A disease of the stomach characterised by the presence of an ulcer of varying depth, beginning in the mucous coat and attended by pain, vomiting, and hæmatemesis” (*Leith*).

The ulceration mostly affects the mucous membrane of the stomach, but when the ulcers become deep the muscular coats and the peritoneum may be also involved. The results of this condition are varied. The ulcer may heal without complications. It may leave a scar which contracts. The stomach may become fixed by adhesions. There may be perforation, which leads to peritonitis.

Symptoms.—Severe pain in the region of the stomach. This may continue after the ulcer is healed and is then due to scar contraction involving nerves. Vomiting, dark red in colour, due to blood mixed with mucus. Black fæces, also due to blood. Tenderness over the region of the stomach. Flatulence.

The medical treatment of this condition varies according to the severity of the symptoms. Massage is not ordered in the early stages, but during convalescence its use is beneficial. The whole body may be treated except the abdomen. Massage is here forbidden until at least two months after the ulcers have healed. Even then no manipulations should be given over the stomach, but if constipation is present the colon may be cautiously treated. Nothing must be done which in any way could tear adhesions or open a scar.

ENTERITIS

Enteritis is inflammation of the small intestine. It varies in intensity from a simple catarrh to such grave conditions as suppuration and ulceration.

The treatment is entirely in the hands of the doctor.

Chronic Enteritis.—The changes occurring within the intestine are similar to those in the stomach in chronic gastritis. Digestive symptoms arise due to alterations in the intestinal juices, both in quantity and quality. There is an excess of mucus, diminished peristalsis, less absorption, and a lowering of general nutrition. The condition may be caused by chill, errors in diet, or changes in the circulation. It is most common in children.

Symptoms.—Diarrhœa or constipation. Abdominal pains. Flatulence. Mental depression. The fæces contain undigested food, mucus, and sometimes blood.

Treatment.—Warmth and rest. The diet must be carefully regulated.

General massage may be given for improving nutrition and circulation. Special abdominal treatment to relieve constipation by strokings, kneadings, and colon frictions. Stimulating movements—*e.g.* lumbar side shaking, cross abdominal shaking, if the patient can bear them. Tender spots must be treated with caution. If the abdomen is distended, the manipulations must be very gentle. If diarrhœa is present, only vibrations over the whole abdomen may be applied.

COLITIS

Inflammation of the colon, in various degrees of intensity, is called colitis. The following are important varieties:—

Ulceration of the Colon.—This condition is present in dysentery and typhoid fever, but it is also seen independently of these diseases.

Symptoms.—Diarrhœa ; blood is present in the fæces. Constipation at intervals. Abdominal pain, distension and tenderness. The tongue is furred. The temperature may rise. There may be emaciation and anæmia, and cardiac failure is sometimes a result.

This condition is serious, and its treatment entirely in the hands of the doctor. Complete rest in bed is ordered.

Chronic Catarrhal Colitis, often called **Mucous Colitis**.—This may accompany enteritis. It is often characterised by the passing of large quantities of mucus. The condition usually occurs in people of nervous dispositions, with a tendency to dyspepsia and neurasthenia.

Symptoms.—Some or all of the following may be present :—Constipation. Diarrhœa accompanied by the passage of blood and mucus. Gripping pain. Distention of the abdomen and tenderness to pressure on some part of the colon. A furred tongue, nausea and vomiting. Sometimes slight fever is present.

Treatment.—This should follow the same lines as those laid down for enteritis. The patient's mental attitude must be considered.

General massage may be given to improve nutrition and circulation, also to influence the nervous system.

Abdominal treatment requires special attention. Much kneading, and colon frictions to relieve constipation. Vibrations over tender areas. Stimulating movements, *e.g.* cross abdominal shaking and lumbar side strokings, if the patient can bear them.

Breathing exercises are beneficial.

APPENDICITIS

Appendicitis is inflammation of the vermiform appendix. There are inflammatory changes in the mucous membrane, which extend to the outer coats. Later adhesions may form. The inflammation may go on to suppuration and perforation, causing abscess and peritonitis.

The condition may be due to continued constipation, to a foreign body stationary in the appendix, rheumatism, gout, etc.

Symptoms.—Constipation, abdominal pain, specially in the right iliac fossa, vomiting, swelling and tenderness in the cæcal region. The temperature rises.

Massage may be ordered when the patient is convalescent, when general massage may be given. If the appendix has been removed, abdominal massage may be given with caution. Care must be taken not to over-stretch the scar. Much vibration should be used in the early stages of the treatment, and gentle kneadings and frictions added by degrees.

In old-standing cases adhesions may cause pain. These must be stretched with great caution. If the appendix has not been removed abdominal massage must not be given.

VISCELOPTOSIS OR GLÉNARD'S DISEASE

Visceroptosis is a falling of the abdominal viscera. "The normal relations of the viscera to each other and to the parietes is maintained by the elastic pressure of the anterior abdominal walls, by suspensory bands of peritoneum, by the attachment of viscera to each other, and by the support afforded by blood-vessels. The whole abdominal contents

may occupy a lower and more anterior position than normal, as a result of pressure from above, such as is produced by tight lacing or the suspension of heavy clothing from a band around the waist. The action of gravity will produce a similar effect whenever the muscles of the anterior abdominal walls are permanently relaxed from want of tone or from previous over-stretching. General visceroptosis is therefore much commoner in, though not confined to, the female sex. It is sometimes associated with hernia, and has been attributed to over-exertion and to straining in habitual constipation" (*Shaw*).

Gastropptosis is a sinking of the stomach from its normal position. This often takes place combined with a sinking of the other abdominal viscera, or the stomach may be displaced alone. The condition may occur when the organ is healthy, but is more frequently seen during dilatation. In such cases the greater curvature of the stomach has been found to reach almost to the pubes.

Symptoms.—These are variable, and are often associated with a nervous condition. The functions of any of the displaced organs may be interfered with, resulting in dyspepsia, vomiting, constipation, attacks of colic, etc.

Treatment.—The cause must be removed. This is possible if there has been pressure from above. Corsets should not be worn, but the clothes suspended from the shoulders. If the cause is weak abdominal walls, much can be done to restore their strength and tone. An abdominal belt is often ordered.

Abdominal massage should be given, and the manipulations done in an upward direction as much as possible. It is often advisable to raise the end of the bed or couch during the treatment.

MOVABLE OR FLOATING KIDNEY

A sinking of one of the kidneys within the abdominal cavity. The right is more often affected than the left.

The normal kidneys move considerably with respiration. This movement may increase to a variable degree, the increase may be slight, or the mobility so marked that the

organ can be moved about freely in the abdominal cavity. This is called a floating kidney. The condition is more prevalent in women than men. It is usually due to absorption of fat in the lumbar region, within which the kidneys are embedded. The causes are :—lax abdominal walls, sudden strains or injuries, etc.

The patient is often of a neurasthenic type, and is generally thin and emaciated.

Symptoms.—Often there are none, and in nerve cases it is inadvisable for the patient to be told that the position of the kidney is abnormal. There may be dull aching pains in the abdomen and lumbar region, and sometimes abdominal distension.

Digestive and hysterical symptoms are often present.

The kidney may be felt to move under the hand through the abdominal wall from the front.

Treatment.—If no symptoms are present, no treatment is required. Pain and discomfort are often removed by wearing a belt with a suitable pad. Massage is very helpful, and Weir Mitchell treatment is sometimes ordered to help the general condition. Abdominal massage is given after the kidney has been replaced by the masseuse. This is done by placing one hand firmly under the patient in the lumbar region, and the other beneath the kidney, pressing gently inwards and upwards from the front abdominal wall. All abdominal treatment must be given with caution, for any manipulation tending to increase the mobility of the organ would be harmful.

HÆMORRHOIDS OR PILES

Hæmorrhoids or piles are varicose veins at the lower end of the bowel. They take the form of protruding masses inside and outside the anal opening. The hæmorrhoidal veins are liable to become dilated and varicosed. It is a common condition in people of middle age and advanced years, and a symptom of certain cardiac, hepatic, and uterine diseases. Hæmorrhoids also occur as a result of the straining of constipation.

Symptoms.—Pain on action of the bowels. Bleeding which

may result in anæmia. Pain in the back and general ill-health.

Treatment.—Massage is ordered as an adjunct to other treatment, though little can be done locally by massage. If the abdomen is treated for constipation, the movements must be done cautiously. Anything vigorous, *e.g.* leg rolling for constipation, should be avoided.

CHAPTER XIV

Acute rheumatism or rheumatic fever—Chronic rheumatism of joints
—Muscular rheumatism—Fibrosis —Pleurodynia —Lumbago—
Rheumatism of the head—Rheumatoid arthritis—Myopathy—
Gout—Polyuria or diabetes insipidus—Diabetes mellitus—Rickets
—Obesity—Respiratory diseases—Chronic bronchitis—Adenoids.

ACUTE RHEUMATISM OR RHEUMATIC FEVER

RHEUMATIC fever is an acute disease caused by certain bacteria.

It is characterised by fever, sweats, inflammatory and other changes in the joints. Some internal organs, especially the heart, are frequently affected. The joints attacked during the course of the disease are bright pink, painful and tender.

The treatment is entirely medical. Massage is never employed.

CHRONIC RHEUMATISM OF JOINTS

Chronic rheumatism of the joints is characterised by inflammatory and degenerative changes of varying degrees in the joints.

Such conditions may be the result of acute attacks, but are also due to poisons in the alimentary canal and improper elimination. It is also brought on by physical and mental exhaustion and exposure to damp and cold.

Symptoms.—These are very varied. The most marked are pain and stiffness in the joints, which are aggravated by cold and wet weather, and increased at night. Generally several joints are attacked.

“The pain is of a severe aching wearying character, attended by a sense of heaviness and uselessness of the limb; it is relieved by rubbing, and by exposure to a cold atmosphere;

and is increased by slight warmth. Free use of the joint, although at first attended by pain, often affords temporary relief; while on the other hand undue exercise of the limbs during the day is liable to be followed by severe aching in the night. The affected joints also feel markedly dry and stiff, and creak on movement; but exercise and rubbing may remove these sensations. These symptoms may last indefinitely for years, either recurring at intervals, especially in the winter and spring seasons, or being persistent almost day and night without intermission" (*Bruce*).

Treatment.—The patient's general condition must be improved as far as possible. The diet is carefully regulated. Sometimes meat and sometimes carbohydrates must be avoided.

Massage usually forms part of the treatment. In many cases deep manipulations can be borne and are very beneficial, but their strength must be influenced by the severity of the condition. Careful passive movements should be given to a small degree at first, and gradually increased. These should be done in spite of their causing pain, but with care.

Hot-air and other baths are often beneficial combined with massage.

MUSCULAR RHEUMATISM

"Muscular rheumatism is a disorder of fibro-muscular structures, characterised by local pain and spasm, and a certain degree of fever, and generally associated with the rheumatic diathesis" (*Bruce*).

"Fibrosis" is a term synonymous with muscular rheumatism. The condition may occur in any region of the body. There is increase of white fibrous connective tissue, and it is sometimes accompanied by exudation which gives rise to swellings and thickenings. Persons of all ages and both sexes are liable to this complaint. It is usually caused by exposure to cold, exposure of a muscular part to draught after exertion, also to sprains or strains of muscles. Spasmodic pains are felt on movement. When the affected muscles are at rest there is relief. "The constant effort to avoid pain gives rise to a feeling and appearance of stiffness,

causing the patient to assume characteristic attitudes of the head, trunk, or limbs" (*Bruce*).

Symptoms.—Spasmodic pains on movement. Tenderness in the muscles. Some joints may be painful and stiff. There are often constitutional symptoms, viz. slight fever, loss of appetite, furred tongue, and constipation.

Treatment.—The general condition of the patient must be improved, and the local pain relieved. Rest and warmth are essential, hot applications, hot-air or Turkish baths.

Massage often affords great relief.

VARIETIES OF MUSCULAR RHEUMATISM

Muscular Torticollis or Stiff Neck.—The sterno-mastoid and other cervical muscles are involved. The head is held in a fixed position.

Treatment.—Massage of neck and shoulders. No movements are possible at first, but as the pain decreases limited passive movements of head are given, gradually increasing them, and later active movements are added.

Pleurodynia.—Rheumatism in the muscles of the chest wall. The pain is generally one-sided, and is felt with each respiratory act. Probably a particular intercostal space is the seat of tenderness, or the origin of the pectoral or serratus muscles.

Treatment.—The movement of the corresponding ribs is fixed by a plaster or bandage, and later massage may be given as for intercostal neuralgia.

Lumbago.—This is a form of muscular rheumatism. It is probably due to inflammation of the fasciæ between the large muscles of the back. There is characteristic pain in the loins, specially felt when such movements are done as bending forwards, straightening the back, rising from the sitting position, or turning in bed. The muscles are tender when touched.

The condition may be caused by rheumatism, gout, chill, or over-strain.

Treatment.—Complete rest and hot applications.

Massage of the lumbar region. Effleurage, vibrations,

frictions and kneading. Time for treatment, 15 to 40 minutes daily.

Rheumatism of the Head.—"Muscular rheumatism may affect the scalp, giving rise to a dull aching kind of headache on the brow or occiput, aggravated by movement, and occasionally complicated with tenderness of the eye-ball and ophthalmia" (*Bruce*).

For massage treatment see HEADACHE.

RHEUMATOID ARTHRITIS

Rheumatoid arthritis is a disease mainly characterised by degenerative and inflammatory changes in the joints, which lead to deformity. The disease is found in persons of all ages and both sexes, but it is commonest in women. One or more joints may be affected.

When the changes manifest themselves in the soft parts the condition is called rheumatoid arthritis, when there are bony changes the term osteo-arthritis is often used.

The causes are uncertain, but it is clear that some micro-organism produces a poison which circulates in the blood, setting up trouble in a joint whose resistance is lowered. It sometimes seems the result of acute diseases, *e.g.* influenza. It is also associated with menstrual disturbances, chronic uterine disease, prolonged physical exertion, unhealthy surroundings, and mental distress. It is sometimes due to injury, the symptoms appearing after a blow or fall. In other cases there is sepsis in the mouth, and it is often associated with colitis.

Changes in the early stages: Enlargement of the affected joint. Synovial membrane, capsule, and ligaments are distended by effusion. A special bacillus may be found in the fluid. The synovial membrane is swollen and thickened. Fibro-cartilages, ligaments, and tendons become softened. The articular cartilage is partly worn away, exposing the bone.

Changes at a more advanced stage: The effusion is less marked or may be quite absorbed. The capsule and ligaments are much thickened. The articular cartilage, fibro-cartilage, ligaments, and tendons may more or less disappear.

The synovial membrane and cartilage become fringed and pendulous masses are found attached to the membrane; these sometimes become free within the joint. The articular surfaces of the bones become altered in shape, and the cartilage is replaced by an ivory-like layer of bone. The disease is a chronic one, but in the early stages repeated acute and sub-acute attacks occur.

Symptoms.—There is pain and stiffness in one or more joints. The joint is swollen and tender. There is wasting of the neighbouring muscles. A characteristic creaking or crepitation can be heard on movement. The mobility of the joints becomes affected, first on account of pain, and afterwards because of the structural changes which have taken place. Deformities arise sooner or later, and these take many varied forms.

There are also symptoms of general ill-health. Anæmia, debility, and poor circulation. Bodily activity is greatly impaired, and often the patient is quite crippled. There may be valvular heart disease, and gastric symptoms sometimes appear.

Treatment.—This must be both constitutional and local. The diet should be carefully regulated. The patient should take daily exercise in sunshine and fresh air. Woollen clothing should be worn both summer and winter.

Massage forms part of the treatment in every stage of the disease except during acute attacks, but it may begin as soon as the pain and swelling have subsided somewhat. Effleurage, frictions, muscle kneadings, passive movements to the affected joints.

Note.—The passive movements must not be given until pain and swelling have subsided.

Abdominal massage helps absorption and elimination. General massage may also be given with great benefit to the patient.

MYOPATHY

Myopathy is a condition in which atrophy of some muscle-groups occur, while enlargement of others takes place. The latter is described as pseudo-hypertrophy, for it is not due to

increase in size of the muscle fibres but rather to deposits of fat and fibrous tissue. Sometimes enlargement of the muscles is the most strongly marked, in others atrophy is more prominent. This disease is an hereditary one. Several members of a family may be attacked, and it is sometimes traced through several generations. It shows itself in early life, few cases beginning after the twentieth year.

Symptoms.—The child gradually becomes clumsy in his or her movements and falls about.

Muscles which usually become enlarged are:—Those of the calf, the extensors of the knee, specially vastus externus, and gluteus maximus. Deltoid, supra and infra spinati and triceps. Erector spinæ is enlarged in some cases, atrophied in others.

Muscles which atrophy are:—The lower half of pectoralis major, and latissimus dorsi; biceps and sometimes serratus magnus. The flexors of the knee, and the adductors and flexors of the hip.

All the affected muscles are weak, and deformities of the spine frequently appear. The patient has difficulty in rising from a recumbent position.

Treatment.—The patient's general health must be maintained.

Massage of the atrophied muscles is essential. Dr. J. S. Risien Russell writes:—"Of local measures in the treatment of these cases, both massage and galvanism are of great importance. By their aid we may hope to influence favourably the nutrition of the muscles, and thus retard or arrest the progress of atrophy, so that these measures should be persevered with, no matter how discouraging the result may seem. Passive movements are of great service in preventing contracture, and when shortening of muscles has already occurred tenotomy is indicated, where there is reason to suppose that this measure will enable the patient to use his limbs again."

GOUT

Gout is a constitutional disease in which undue proportions of uric acid are present in the blood. The name is derived

from "gutta, a drop," on account of an ancient idea of the dropping of a morbid fluid into the joints.

The condition is one of perverted metabolism. There is imperfect elimination of the toxic products in the blood, excess of uric acid, and there are deposits of biurate of sodium in the joints and other structures.

The disease is generally characterised by an inflammation of the joints, the smaller ones being attacked first, specially the metatarso-phalangeal joint of the great toe. There are other general symptoms.

Gout occurs in acute attacks which are recurring, or it may become a chronic condition. The gouty diathesis is also spoken of, which means a constitutional predisposition towards the disease. It is more common in men than in women, and usually first appears between the ages of thirty-five and forty.

Gout is due to: (a) hereditary transmission; (b) errors in diet; (c) the influence of lead upon the system.

An attack may come without any exciting cause, but it is often due to: exposure to wet and cold, injudicious eating and drinking, worry, anxiety, injury, after acute illness, etc.

An Acute Attack.—The patient is usually aroused from sleep in the night, with much pain in the great toe. Tenderness of the affected joint is very marked; the patient dreads to be touched or moved, and cannot even bear the weight of the bedclothes. The joint is hot, swollen, deep red in colour, and the skin shiny and tense. There are general symptoms, *e.g.* raised temperature, acid perspirations, loss of appetite, furred tongue, constipation, changes in the urine. The patient is restless and irritable. The attack lasts from 3 or 4 days to 2 or 3 weeks. As the acute symptoms diminish, there is often œdema of the surrounding parts of the affected joints, which pit on pressure, and this condition may remain for some time.

At first the treatment is entirely medical, but when acute symptoms have subsided, gentle massage and movements may begin to reduce œdema, restore movement, and improve the general condition. Later, general massage may be of great benefit.

CHRONIC GOUT

This is generally the result of acute attacks, and gradually more and more joints become affected. The articulations become enlarged, deformed, stiff, and crippled in movement. Chalky concretions are laid down. These sometimes may become so enlarged that they break through the skin, and come away in solid particles, or in liquid form. Such concretions are called chalk-stones. The general system is more or less affected with disorders of digestion, respiration, skin and kidney diseases, etc.

Treatment.—People possessing the gouty diathesis, by careful attention to their ways of living, may ward off the disease. Suitable food should be taken, and the stomach never over-loaded. Attention to general hygiene is important, *e.g.* fresh air and regular exercise. Chills, worry, anxiety, etc., should be avoided.

The diet must be carefully regulated.

Massage must aim at improving the circulation and digestion, and in helping elimination. Local massage and passive movements may be given to affected joints, but the treatment must continue for long, and the result is often unsatisfactory.

POLYURIA OR DIABETES INSIPIDUS

“ A malady characterised by thirst, and a persistent excessive flow of watery urine, which has a low specific gravity, and contains neither albumen nor sugar ” (*Harold*).

This disease is often connected with nervous affections, and it is usually hereditary. Usually the bowels are confined and the skin dry.

Treatment.—This should include much rest and a nourishing diet. The patient should be warmly clothed, and guarded against chills. Change of air and scene is often necessary.

Massage, when ordered, should be general, and easy exercises may be added.

DIABETES MELLITUS

Diabetes mellitus is a disease of disordered metabolism. It is characterised by the presence of grape-sugar in the urine. It may occur at any age, and is more common in men than in women.

The following are some of the causes: an hereditary predisposition, exposure to cold, gout, mental emotion, and a diet containing too much carbohydrate.

If young people are attacked, the disease takes an acute form, there is rapid wasting, and death ensues. If it occurs in elderly people, they remain well nourished, and the disease is not usually fatal.

Symptoms.—These vary according to the severity of the disease, the age of the patient, etc. There is an excessive flow of urine containing sugar. Thirst, wasting, and muscle weakness are present. Complications occur, a characteristic one being “diabetic coma,” *i.e.* the patient becomes deeply unconscious, and this condition generally ends in death.

Treatment.—This is chiefly dietetic, and needs careful regulation.

If massage is ordered, it should aim at helping the general nutrition by effleurage and muscle kneading, and improving the digestive processes by careful abdominal manipulations.

RICKETS

Rickets is a general disease of malnutrition occurring in children. The natural growth and development of the body is arrested, ossification and dentition are delayed, the bones become soft and yield to pressure, and the muscles and ligaments waste. In many cases there are alterations in the brain, liver, spleen, and lymphatic glands.

The greatest factor in producing rickets is improper food, specially the giving of much starchy food to the young child. Other causes are uncleanness, want of fresh air, sunlight, and sufficient exercise.

Early General Symptoms.—The child may be flabby and

fat or thin. The digestion is disturbed, and vomiting and diarrhœa are often present. The mucous membrane is pale, the spleen is enlarged, and the whole abdomen protrudes. There is profuse sweating of the head, face, and neck. The child is irritable and restless, and throws off the bedclothes when sleeping.

Bony Changes.—Owing to the retarded growth and softness of bones many changes occur, producing deformities.

The head becomes flattened from back to front, the forehead appears square in shape and enlarges. Ossification of the cranial bones is very slow, and the fontanelles remain open much longer than usual (after the end of the second year).

The teeth are late in appearing, stunted in growth and defective in enamel, and often quickly decay. The shafts of the long bones, when softened, bend in various directions; there is abnormal development of the epiphyses.

The spine may become kyphotic. This occurs when the child is allowed to lie much in bed with a high pillow, or is carried about with a curved back. Sometimes scoliosis appears; when a child is carried on the nurse's arm, a bad position is often assumed, the pelvis is tilted, and the spine curves laterally.

There are characteristic changes in the thorax. The "rickety rosary" is a bead-like formation on each side of of the sternum, at the junction of the ribs with the costal cartilages. It is due to the enlargement of the ends of the ribs. "Pigeon breast" is a condition in which the sternum is pressed forwards, causing the thorax to be enlarged from back to front, and the curvature of the ribs at their angles is increased.

The prominence of the abdomen is due to the enlargement of the viscera, and distension by flatulence. The linea alba is often widened. A child with such an abdomen is often described as "pot-bellied."

The shape of the pelvis is often considerably altered. It becomes triangular, and sometimes very narrowed. It is pressed upon by the spine and abdominal contents from above, and by the heads of the thigh bones from below.

Later in life, the effects of such a deformity upon parturition may be very serious.

Scoliosis, kyphosis, coxa vara, knock knees and bow legs, all of which may occur as the result of rickets, are dealt with in detail in another chapter.

Treatment.—General hygienic conditions and diet must be corrected. The living-rooms should be well ventilated, and the child taken out regularly into the open air. He must be warmly clad, and his daily bath given quickly to avoid chills.

The diet should consist chiefly of good cow's milk, diluted if necessary with lime water. The following may also be added—the juice of raw beef, other prepared meat-juices, broth, bread-and-butter, the yolk of an egg, etc. Later a small amount of farinaceous food may be given. Food digestible to one child is indigestible to another, therefore the diet must be regulated with the greatest care. The mother should understand that the child's recovery depends upon her watchfulness and care.

Deformities must be prevented if possible, by keeping the child in the recumbent position. He must not be allowed to crawl or run about. A wicker tray has been devised for a rickety child to lie in. Some surgeons advocate his sleeping in a specially moulded plaster bed. The bowing of the legs, which is generally caused by the child walking while the bones are still soft, may be prevented by wearing light, well-padded splints, which project below the feet.

Massage when ordered should be general, and applied with a lubricant. Effleurage, muscle kneading, and gentle passive movements may be given, together with manipulations to correct any deformities, viz. gentle pressures to the thorax, and also on the knees to straighten the legs. Abdominal kneading may be given with care.

OBESITY

Obesity is a condition produced when an excessive amount of adipose tissue is developed in different parts of the body. It is generally due to disordered nutrition, and sometimes

causes disturbances of the usual functions of the body. It may be of hereditary origin, but is also seen in people suffering from such diseases as rheumatism, gout, and diabetes.

Excessive corpulence is more common in women than in men. It may be associated with disturbances of menstruation and pregnancy; it also often manifests itself at the climacteric period.

Obesity seems to vary in different races and climates. Among the ancient Greeks and Romans it was considered a disgrace, while among certain castes of Hindoos it has been highly esteemed. Fat people are met with in all climates, but they are seen less in hot and mountainous districts. Sedentary occupations undoubtedly favour corpulency in both sexes; this may be increased by excessive eating, and the taking of alcohol.

Food.—Although taking a large quantity of food may cause a person to become fat, it does not always do so, for very thin people are often large eaters, and some who become fat have poor appetites. Neither does the kind of food taken always make a difference. Some will get fat whatever they eat, and others remain thin in spite of much nourishing food.

The fatty tissues must be derived from the fat, starch, and proteids of the food taken. But the fact that they are stored in the body as adipose tissue shows that the chemical processes are not complete, oxidation is delayed, or these substances would be converted into carbonic acid and water and eliminated from the body.

Fat is often deposited in large quantities in the subcutaneous tissues; the areas usually chosen are the abdomen, the buttocks, the neck, and breasts. It is often present in excess within the great omentum, *i.e.* the apron-like fold of peritoneum extending over the organs from the lower border of the stomach. The usual weight of the omentum is $\frac{1}{2}$ lb. it may increase to 7 or 8 lb. in the obese.

Fat is also deposited beneath serous membranes, so is sometimes largely present in joints. The muscular tissues often become infiltrated with fat. Certain organs, chiefly the liver and heart, become enlarged, and fat is deposited within their tissues.

Treatment.—The diet must be regulated in quantity and quality. There are various systems of dietary for the corpulent. (Under no circumstances should a patient try to become thin by a process of self-inflicted starvation.) The diet should always be regulated by the doctor, who orders as a rule a withdrawal of fatty and starchy foods, and some increase of proteids.

“The weekly loss of weight should not exceed 3 lb., and the total loss not go beyond 28 lb.” (*Allchin*).

Regular exercise must be taken according to the patient's powers; riding, walking, etc. In certain cases this is replaced by massage and exercises.

General massage should include breathing exercises, much petrissage, kneading, picking up and frictions of the fat masses, also passive and active movements.

Free exercises are also of great benefit, but must be regulated according to the patient's strength. If heart symptoms appear, all precautions must be taken as described for heart disease.

RESPIRATORY DISEASES

The student is referred to books on nursing for the history and treatment of such diseases as acute bronchitis, pneumonia, and pleurisy. They are never treated by massage or exercises, but during convalescence, or when bronchitis becomes chronic, massage may be given for general strengthening and breathing exercises to improve the condition of the lungs. After the removal of adenoids, breathing exercises should be taught to establish a good habit of breathing, and improve the condition generally.

CHRONIC BRONCHITIS

Chronic bronchitis is a chronic inflammation of the bronchial tubes. It is often the result of repeated acute attacks, but may arise from other causes. The symptoms vary in different cases, but some of the following are present: cough, expectoration, pain, soreness and uneasiness behind the sternum,

and dyspnoea (difficult or laboured breathing). The condition is often accompanied by emphysema (dilatation of the alveoli of the lungs). There is always a danger of the chronic form becoming acute, especially among the aged.

Treatment.—Great attention must be paid to the general constitutional condition of the patient.

Massage and exercises should be given with the aim of increasing mobility of the thorax, helping expectoration, improving the intake of oxygen and the discharge of CO_2 and stimulating the lung tissue.

Sometimes general massage is ordered; special attention should be paid to the thorax by giving much friction on the intercostal muscles. Deep breathings and chest clapping are very beneficial.

ADENOIDS

Adenoids are increased growth of the mass of lymphoid tissue present at the back of the nose of all young subjects. In children the lymphoid structure is soft and bulky and tends gradually to become absorbed. But if the adenoids increase and remain, towards adult life they become firmer and more fibrous.

Symptoms.—Often not marked, but the following are usually present: mouth breathing, snoring when asleep, the voice is modified and there is inability to pronounce properly m, n, th, p, and t. There may also be a vacant expression, nasal discharge, deafness, and stunted growth.

The condition is often accompanied by enlarged tonsils, enlarged cervical glands, and thickening of the nasal mucous membrane.

Treatment.—In most cases this must be surgical. After operation, however, much can be done to improve the general condition, and the after-treatment should aim at increasing mobility of the thorax, expanding the chest, stimulating the lung tissue and training the patient to breathe through the nose instead of the mouth. Massage of the chest and back is given, and exercises to improve respiration and circulation.

A SPECIMEN TABLE OF EXERCISES

(For a boy of ten who has had adenoids removed)

1. Lying, deep breathing. 6 times.
2. Lying, double arm flexion and extension. 6 times.
3. Lying, with shoulders raised, leg rolling. 12 times.
4. Wing stride standing, trunk rolling. 6 times each way.
5. Sitting, chest lifting. 6 times.
6. Neck firm sitting, chest expansion. 6 times.
7. Wing stride sitting, back raising. 6 times.
8. Chest clapping, the series repeated 4 times, deep breathings between each.
9. Wing stride standing, trunk bending forward and raising and deep breathing. 8 times.
10. Wing sit lying, raising and sinking, and deep breathing 6 times.
11. Swim standing, arm casting. 12 times.
12. Grasp lying, single alternate leg lifting. 6 times.
13. Lying, deep breathing. 6 times.

Massage of back and chest, with special frictions on the intercostal muscles, and much light hacking. Time for massage 20 to 30 minutes.

CHAPTER XV

DISEASES OF THE CIRCULATORY SYSTEM:—Blood pressure—Heart disease—Treatment by massage—Nauheim treatment—Anæmia—Chlorosis—Phlebitis—Thrombosis—Embolism—Varicose veins—Phlegmasia alba dolens or White Leg—Œdema.

BEFORE approaching the ways in which the circulatory system may be diseased, it is essential that the student thoroughly masters the anatomical structure and physiology of the normal heart, and the whole process of the circulation, and in order that the various abnormal changes which will be described later may be understood, a short account of the cause and meaning of blood pressure will now be given.

BLOOD PRESSURE

Arteries are tube-like structures containing within their walls a considerable amount of muscular and elastic tissue. Owing to their elastic properties they stretch when pulled, and increase in bore when distended. On account of the muscle fibres they contain, they keep their tubular form when empty.

During life the arteries are full of blood, and their walls are always on the stretch, for the blood is continually pressing upon them with considerable force. On the other hand, owing to the elasticity of the arterial walls, the vessel is exerting the same amount of force upon the blood, for "the reaction of an elastic substance is equal to the straining force." This constitutes *Blood Pressure*. This equal pressure causes the blood to be squeezed on towards the capillaries.

Peripheral Resistance.—When approaching the capillaries the blood has a force to overcome. An artery is continually

branching and dividing, each branch becoming smaller than the last, but eventually all these small arteries cover a larger area than the original trunk ; the blood therefore has a larger surface to cover, and its flow becomes gradually slower, just as the water of a river flows quickly when the banks are narrow, and becomes slower at its wider parts. While the blood is in the smaller arteries and capillaries (corresponding to the wide part of the river) its passage is hindered by considerable friction between it and the walls of the vessels. This friction is due to the greater extent of the vessel walls, and the slower passage of the blood through them. The friction causes what is known as peripheral resistance. It is greater in the small arteries than in the capillaries, for the blood is moving faster, and they have elastic walls, whereas in the capillaries the blood stream is slower and the elasticity of the vessel walls has disappeared.

A great deal of the pressure in the arteries is used up in overcoming the peripheral resistance, only just enough remaining to send the blood along to the veins. " Hence the blood pressure is greatest in the arteries, less in the capillaries, and least in the veins, and fluids always flow from a place of higher pressure to a place of lower pressure " (*Thornton*).

Muscular exercise and the movements of respiration help the blood flow in the veins. There is diminished pressure in the thorax when it enlarges during inspiration, and this causes blood to be drawn from the great veins into the right ventricle of the heart.

The Pulse.—Every time the left ventricle of the heart contracts, fresh blood is pumped into the already distended arteries. This extra wave of arterial expansion is known as the pulse. " Part of the force of the contraction of the ventricle sends the blood into the aorta, and part goes to increase the expansion of the walls of the arteries, and at the same time the pressure of the blood. The blood pressure of the arteries thus raises and falls with the heart beat " (*Thornton*). The heart therefore keeps up the force exerted by the stretched arteries and causes the blood to be squeezed on in them. The pulse may be compared to a wave produced by the wind on the surface of a slow stream; it travels

at the rate of about 30 feet per second, whereas the actual blood flow is much slower, about 1 foot per second.

When examining a patient it is often necessary for the physician to ascertain the blood pressure within the arteries. This is done by an instrument called a sphygmomanometer. A pneumatic pad is fastened round the arm, and distended with air until it exerts enough pressure to stop the pulse. When this takes place the pressure in the pneumatic pad is equal to that within the arteries. The pressure is then measured by the instrument, which shows a column of mercury rising according to the arterial pressure.

In a normal adult the pressure raises the column of mercury 120 millimetres high. As people get older, the blood pressure rises ; in a man of sixty it would rise to 145 mm.

In arterio-sclerosis, when the arteries become thickened, the blood pressure is greatly increased ; if it rises above a certain height the blood-vessel breaks. When this takes place in the brain it may cause death from apoplexy, or paralysis of one half of the body (hemiplegia). The blood pressure is very high in chronic kidney disease (Bright's disease). It may reach 250 mm. In nervous excitable people the pressure is often higher than usual.

The lowest blood pressures are recorded in Addison's disease, when it may fall to 65 mm.

HEART DISEASE

The heart may be diseased in many ways. Some chronic forms are suitable for treatment by massage.

Disease of the Valves.—This is often caused by inflammation during acute rheumatism. There may be incompetence or regurgitation, *i.e.* the valves do not close completely. There may be stenosis, *i.e.* the valves do not open completely. Either of these conditions occurs in the mitral or aortic valves, and they may be combined in any way.

Disease of the valves on the right side of the heart generally exists from birth and is usually diagnosed as congenital morbis cordis. Such cases are rarely suitable for massage treatment.

Fatty Infiltration of the Heart.—"There is increased deposit of fat in the connective tissue around the heart, and between its muscular fibres. The heart is thus hampered in its work and its force is diminished." This condition is often found in patients suffering from obesity.

Degeneration of the Heart Muscle.—There is degeneration of the muscle fibres, and the working power of the heart is much reduced.

Dilatation of the Heart.—Enlargement of the organ due to laxity of muscles. It may be due to over-strain, over-work, anæmia, rheumatism, or be the result of some acute disease, such as typhoid, pneumonia, etc. There are the usual heart symptoms as given below, and sometimes the following are added: a weak, rapid heart-beat and pulse, which may also be irregular. Breathlessness.

Nervous Heart Disease.—This is a functional condition, and may be caused by excessive smoking; excessive drinking of tea, coffee, or alcohol; dyspepsia or anæmia.

Symptoms.—Palpitation, discomfort in the region of the heart; rapid, slow, irregular, or intermittent pulse; breathlessness; nervous symptoms, *i.e.* insomnia, etc.

GENERAL CHANGES AND SYMPTOMS IN ALL FORMS OF HEART DISEASE

Changes.—The blood pressure in the arteries is usually lowered.¹ The rate of the blood stream is lessened. The exchange of gases both in the lungs and the tissues is lessened. The veins become overloaded. There is increased exudation of fluid in the tissues, producing œdema. All these changes increase the resistance to the blood stream and the work of the heart.

Compensation.—The heart has always some reserve power upon which it can fall back when called upon to do increased work. So long as this reserve power is available, no perceptible change occurs, but when it is used up definite

¹ In heart disease associated with kidney disease or arterio-sclerosis the blood pressure is raised.

symptoms arise, viz. a further lowering of the blood pressure, lowering of nutrition, and a loading of the blood with CO_2 .

Symptoms.—Cyanosis (blueness), due to excess of CO_2 in the blood. Dyspnœa (difficult breathing, due to insufficient supply of oxygen). Coldness of the hands and feet, due to slow circulation. Pain and discomfort in the region of the heart. Palpitation on exertion. Œdema of the feet and legs, caused by venous congestion and ascites. Nervous symptoms, i.e. exhaustion, insomnia, irritability, yawning. Digestive symptoms, and changes in the heart sounds and pulse.

Treatment.—Rest is very important. Massage and movements are used to improve the circulation, and so relieve the heart of extra work.

The following may be given:—Breathing exercises. Effleurage and kneading of the extremities. Passive movements, especially rollings.

Back massage, including effleurage, kneadings, and vibrations, is best given with the patient in a sitting position, leaning forward on some support.

Abdominal massage. This is often beneficial, but its effect on the pulse must be carefully watched.

Local heart treatment which stimulates the heart to stronger contractions without increasing its work.

Time for treatment, 20 to 40 minutes.

Heart patients often exact from their nurse and masseuse much patience, care, and tact. The patient must not be over-tired during treatment. Such signs as sighing, yawning, changes of colour, drawing of the mouth, perspiration, or faintness must be considered, and if necessary the treatment stopped. The patient's position must be restful and comfortable, the head and shoulders raised by pillows. The patient should never be asked to lie prone or on the left side. The arms should not be raised above shoulder height.

These suggestions are given according to the Swedish methods. In some cases the Nauheim treatment is ordered instead.

THE SCHOTT-NAUHEIM TREATMENT

At Nauheim two doctors named Schott have systemised a method for the treatment of heart patients. It consists of a series of baths, alternating with graduated exercises. There are springs of warm effervescing waters of varying strengths in which the patient bathes. The waters contain chloride of sodium, chloride of calcium, and a varying amount of carbonic acid gas. The course of baths begins with the springs weak in carbonic acid gas, and is gradually increased till the patient bathes in strong carbonaceous waters. The baths may be prepared artificially by adding the required ingredients to a given amount of water in an ordinary bath. Sandow's preparations for this purpose are well known. They are "put up in boxes containing four packets of bicarbonate of soda and eight tablets of acid sulphate of soda. Eight parts of the former exactly neutralise twelve parts of the latter, but the alkali should always be in excess. Thirty-two ounces of bicarbonate of soda with 22 ounces of acid sulphate will make a good bath of 40 gallons of water. . . . A whole packet of Sandow should be added to 40 gallons of water containing about 10 lb. of chloride of sodium and 10 oz. of chloride of calcium to make a strong bath. . . . At the commencement of the treatment however, where no effervescence is desired, the bath can be made up with 4 lb. of chloride of sodium, and 6 oz. of chloride of calcium. Later, half a box of Sandow may be added to this, and later again a whole box used with the stronger brine. The material for brine can be easily obtained from the Salt Union at Nantwich" (*Luke and Forbes*).

The patient should lie in the bath entirely immersed in the water up to the neck. The temperature should at first be about 36° C. and be gradually lowered to 30° C. The patient remains in the bath for from 10 to 20 minutes, but must not exceed the prescribed time.

The course generally consists of 12 baths, but not more than 3 should be taken in a week, and exercises are given on the alternate days.

THE EXERCISES

Rules for giving the Exercises

1. Every exercise must be given slowly and evenly.
2. No exercise must be repeated twice in succession.
3. There must be no compression in the grasp.
4. The patient must breathe freely all the time.
5. There must be a pause between each movement.
6. The masseuse must watch for changes in the patient, *e.g.* alteration in colour, perspiration, yawning, sighing, or drawing at the corners of the mouth.

If any of these signs appear, the patient should rest. If recovery takes place shortly, the treatment may continue; but if the signs recur, it should be stopped for that day.

The exercises must be given in a very restful position. In bed at first, or on a couch with the feet supported.

To begin with, passive movements are given in all the joints, beginning with the fingers of one hand, then the other; afterwards doing the same to the toes, and gradually working up to the larger joints. Each movement is performed once only and all are done slowly, and with a pause between each. Time 15 to 20 minutes.

At the next stage the movements are repeated actively with slight resistance, and the time increased. If necessary the whole series may be repeated.

At the next stage the movements are given in the sitting position.

Later the patient stands for the following:—

Arm Exercises.—1. The arms are held horizontal with the shoulders and are carried forward and then back again.

2. The arms are held close to the sides in supination, and the elbows flexed and extended.

3. The hands are linked in front, and the arms raised above the head.

4. The wrists are flexed and extended.

5. The arms are carried forwards to the horizontal position.

6. The arms are carried backwards, as far as possible.

Trunk Exercises.—1. Hands on hips, the trunk is carried forwards and raised. (Resistance when required is given upon the chest when going forwards, and upon the sacrum when raising.)

2. The trunk is rotated to the right and left. (Resistance may be given both ways, at the front and back of the shoulders.)

3. The trunk is alternately bent sideways.

Leg Exercises.—The patient stands holding some support.

1. The leg is flexed backwards from the knee.

2. The leg is lifted up forwards as high as possible with the knee flexed.

3. The leg is abducted and adducted, the knee kept straight.

4. The leg is lifted forwards with the knee straight.

5. The leg is carried backwards with the knee straight.

6. The patient lies with shoulders and feet supported. The feet are flexed and extended.

The exercises must all be graduated in time and strength, resistance is added by degrees, and the time in some cases is increased to one hour. At the end of the course the patient learns to do the exercises alone, making resistance to the movements by contracting the muscles.

The Effects and Uses

The immediate effects of the baths is to produce a glowing sense of warmth on the surface of the body. Small bubbles of gas adhere to the skin, which is strongly stimulated. The cutaneous vessels become charged with blood, to the relief of the overloaded heart. The patient often feels oppressed at first, but this soon passes off after two or three deep inspirations. The pulse becomes more vigorous; at the same time it is reduced 4 to 6 beats per minute. The cutaneous vessels become dilated, while internal ones are contracted. The output of CO_2 , and urine becomes greater. The whole circulation is improved, as well as the general health and nutrition of the patient.

The effect of the exercises is the same as the baths, though the slowing of the pulse does not take place so quickly.

The following are some of the conditions when the Nauheim treatment is of great benefit:—

Fatty infiltration and impaired metabolism.

Chlorosis with dilated heart.

In cardiac dilatation from loss of tone after influenza or other depressing diseases.

Functional and neurotic heart disease.

In some cases of mitral disease.

In certain articular changes, which depend on the presence of an excess of uric acid in the blood.

ANÆMIA

Anæmia is a disease of faulty nutrition. The blood becomes impoverished, and as a result the functions of the body are imperfectly discharged.

The following are some of the chief causes:—Rapid growth, combined with insufficient and improper food; constipation; changes in the lymphatic and blood glands; faulty hygienic conditions, *i.e.* want of light, air, and exercise; the effects of certain poisons such as lead, mercury, and malaria; changes in the circulation caused by such conditions as valvular disease or dilatation of the heart. It also appears as the result of syphilis, tuberculosis, Bright's disease, bleeding from piles, excessive menstruation, etc.

Changes in the Blood.—There is increase or deficiency in the amount of blood, and a decrease in the number of red corpuscles and amount of hæmoglobin.

Symptoms.—General debility, paleness of skin and mucous membrane, the extremities are cold, the lower eyelids and the legs are often œdematous, muscular weakness, the patient is sleepy, dull, and depressed; there is shortness of breath with any exertion, or tendency to faint, and pain in the region of the heart; digestive symptoms, *i.e.* dyspepsia and constipation; a tendency to hæmorrhages, disorders of menstruation, headache, giddiness, and restless sleep.

PERNICIOUS ANÆMIA

This is a grave condition, affecting people of both sexes in middle life. It is characterised by fatty degeneration of

the heart and other serious symptoms, but will not be further discussed here, being unsuitable for massage treatment.

CHLOROSIS OR GREEN SICKNESS

This is the form of anæmia seen frequently in girls and young women.

The amount of hæmoglobin in the red corpuscles is diminished, though the quantity of blood is generally increased. Specific gravity of the blood is much reduced.

Symptoms.—They are the same as those of mild anæmia. The patient often has an excess of subcutaneous fat.

Treatment.—Improve the general condition by attention to hygiene and surroundings. Sunshine, fresh air, moderate exercise, and rest are necessary. The diet must be regulated. Tonics containing iron are usually given.

General massage is given to improve the general nutrition and circulation. Effleurage, petrissage, and passive movements are important. Treat special symptoms, *e.g.* constipation, headache, etc. Breathing exercises should be given. The patient must not be overtired, and should rest after treatment. Time for massage, 30 to 60 minutes.

Note.—It is said that increase of red corpuscles is brought about by abdominal kneading. For other effects see p. 19.

PHLEBITIS

Phlebitis is inflammation of the coats of a vein. It is often combined with thrombosis, though it may be present independently.

The symptoms will be given with those of thrombosis.

Treatment.—Much the same as for thrombosis. Complete rest in bed, hot fomentations or poultices are applied. Some time after the inflammation has subsided, massage may be given to reduce œdema and thickenings. At first effleurage only, later gentle kneadings and passive movements may be added.

THROMBOSIS

“The formation of a solid clot or ‘thrombus’ in the heart or vessels during life. The clotting may occur any-

where in the cardio-vascular system, and rarely even in lymphatics" (*Andrewes*).

Some of the causes are:—Injury to the vessel wall. Acute inflammatory changes, when phlebitis is usually present. Chronic inflammatory changes which cause a roughened surface within the vessel. A slowing of the circulation, due to general debility and wasting diseases. Gout, tuberculosis, and syphilis.

"Thrombosis of a vein—generally of the leg—is usually spoken of as 'phlebitis.' The patient complains of pain in the part, either dull aching or sharp shooting; and on examination one feels a firm rounded cord if the affected vein is superficial. The part is somewhat tender, there is usually slight oedema around the cord, and the skin over it may be slightly or markedly reddened; these symptoms being due apparently to thrombosis causing a phlebitis and periphlebitis" (*Cantlie and Boyd*).

Treatment.—Complete rest. The foot of the bed should be raised, and the limb fixed by a splint or sand-bags. The rest is essential to prevent a portion of the clot becoming severed producing the serious complication of embolism. In the early stages, hot fomentations and poultices are applied.

No massage can be given for 2 to 3 months, after the swelling and tenderness have subsided; then the area of the thrombus should be avoided, e.g. if in the femoral vein, work on the outer side of the thigh only with effleurage. Even 3 months after, kneading and frictions must not be given over the area of the thrombus. Any fresh swelling or tenderness should be immediately reported to the doctor. When the patient is allowed to walk, a firm and evenly applied bandage must be worn.

EMBOLISM

An embolus is a portion of material within a blood-vessel which is carried along by the blood stream. It is usually a detached piece of a thrombus, but may be a fragment of various other tissues. When an embolus reaches the heart or lungs, it may cause sudden death.

In the treatment of thrombosis the possibility of embolism

must always be remembered, hence the importance of complete rest until the thrombus is organised.

VARICOSE VEINS

Varicose veins are those which have become dilated and lengthened. The walls are thickened and thinned in places, and the valves lose their function. The blood stream within the vessels is slowed. Either deep or superficial veins may be affected.

“A varicose condition of the saphenous veins is more frequently met with than in any other veins of the body, except perhaps the spermatic and hæmorrhoidal veins. The main cause of this is the high blood pressure, determined chiefly by the erect position, and the length of the column of blood which has to be propelled in an uphill direction. In normal vessels there is only just sufficient force to perform this task; and in those cases where there is diminished resistance of the walls of the veins, these vessels are liable to dilate and a varicose condition is set up. This diminished resistance may be due to heredity, the vein-walls being congenitally weak, or it may follow inflammatory conditions of the vessels. Increased blood pressure in the veins, caused by any obstacle to the return of the venous blood, such as the pressure of a tumour, or the gravid uterus or tight gartering, may also produce varix. . . . Both the saphenous veins in the leg are accompanied by nerves, the internal saphenous being joined by its companion nerve just below the level of the knee-joint. No doubt much of the pain of varicose veins in the leg is due to this fact” (*Gray*).

Symptoms.—Pain, aching and tenderness. If the superficial veins are affected, the dilatation can easily be seen. There may be swelling of the feet and legs. The following conditions may ensue: ulceration, thrombosis, phlebitis, embolism, rupture, and hæmorrhage.

Treatment.—Much rest with the limb raised, *i.e.* by day the feet should rest on couch or chair; by night the end of the bed should be slightly raised. Bathing with cold water is sometimes advised.

No massage should be given if the veins are very distended and painful, but when these symptoms diminish cautious effleurage may be given, but even this should not be applied over any tender areas. The effleurage should begin above the dilated veins, and the lower parts of the limb be gradually encroached upon. Later kneadings and passive movements may be added with discretion.

When the patient is allowed to walk, a crêpe bandage gives comfort and support, or an elastic stocking is ordered. Under certain circumstances surgical treatment is resorted to, and the varicose veins are removed. This is generally advised if rupture of the veins seems imminent.

PHLEGMASIA ALBA DOLENS OR WHITE LEG

Phlegmasia alba dolens is the name given to a particular swelling of the legs. It is commonly considered to be a disease of the puerperal state, as it is mostly seen in lying-in women, though it does sometimes appear under other circumstances. The left leg is much more often affected than the right. Phlebitis and thrombosis are often present combined with inflammation of connective tissues and lymphatics.

Symptoms.—There is at first acute pain along the course of the femoral vein. Sometimes the thrombosed vein can be felt. Later the pain spreads to the whole leg. The limb becomes swollen, white in colour (hence its name), and has a glossy appearance like polished marble.

Treatment.—Such a condition is unsuitable for massage for some time after all acute symptoms have subsided, then the same lines should be followed as for thrombosis.

ŒDEMA

Œdema is an accumulation of serous fluid in the subcutaneous cellular tissues, causing a swelling which pits upon pressure.

Another name for this condition is dropsy, but this term also denotes the presence of an abnormal amount of serous fluid within structures other than subcutaneous tissues ;

e.g. if present in the peritoneal cavity it is called *ascites*, and if within the pleural cavity, *pleural effusion*.

Œdema is brought about by an increase in the transudation of fluid from the blood-vessels, due to some exciting cause. It is often seen in the legs as a result of heart and kidney disease, and it may be present in the soft tissues after the healing of a fracture.

Treatment.—Steps must first be taken to remove the cause. If heart or kidney disease is present, massage could only give temporary relief. Sometimes, however, the œdema remains though the disease is cured. In such a case massage would be of great benefit, for it would speedily cause absorption of fluid by the lymphatics and capillaries.

After the union of fractures, œdema may be dispersed by the pressure of massage. The limb should be raised, and much effleurage given. Later kneadings, frictions, and passive movements are of service.

CHAPTER XVI

NERVES AND NERVOUS DISEASES :—The nervous system—The structure of nerves—Nerve degeneration—Upper and lower motor neurones—Reflex action—Classification of the two types of paralysis—Paralysis.—AFFECTIONS OF THE UPPER MOTOR NEURONE :—Hemiplegia—Recovery of muscle groups—Order of massage for old-standing hemiplegia—The re-education of movement—Infantile hemiplegia—Paraplegia—Cerebral diplegia—Multiple or disseminated sclerosis—AFFECTIONS OF LOWER MOTOR NEURONES :—Progressive Muscular Atrophy—Anterior poliomyelitis or Infantile Paralysis.

THE nervous system may be likened to a telephone apparatus, possessing a centre for receiving and transmitting messages and a series of wires which carry the message to and from the centres. The brain is the human centre ; in it impulses are generated, and nerves carry the impulses to and from all parts of the body. They pass along the spinal cord, which is connected with the brain by means of the medulla oblongata. The nerves are given off from the cord in pairs, on each side, and pass out through the vertebral foramina. The nerve leaves the spinal cord as anterior and posterior nerve roots. The anterior is an efferent or motor nerve. The posterior is an afferent or sensory nerve. Before leaving the vertebral foramen, the anterior and posterior roots join and form one trunk called a mixed nerve. It contains both afferent and efferent fibres.

Nerves are structures of very varying sizes. They are whitish cords, composed of bundles of nerve fibres enclosed in a sheath. The fibres are microscopic in size, consisting of a central part called the axis-cylinder, a primary sheath, and a medullary sheath. (The latter is of a fatty nature, and it is not present in all nerves.)

The axis-cylinder is the conducting part of the nerve, and it is continuous from the cell where it has its origin to its peripheral distribution. The medullary sheath disappears at certain points. When a nerve is cut, the part of the body it supplies becomes paralysed ; there is loss of sensation or movement, according to whether the cut nerve is motor or sensory ; sometimes both kinds are involved.

The process resulting from cut nerves is known as nerve degeneration, and changes rapidly take place. First the nerve gradually loses some of its excitability, and in a few days this disappears altogether. The contents of the nerve sheath breaks up into small granular masses and disappears ; the axis-cylinder also breaks up. There is nothing left but the primary nerve sheath containing a protoplasmic material.

These changes occupy 10 to 12 days, and take place along the course of the nerve from the cut onwards. The proximal end of the cut nerve does not degenerate, and after a time (2 or 3 months) regeneration begins. New axis-cylinders grow from the cut stump, and pass along the old tract. In the course of time they become surrounded by a new medullary sheath, and when they reach the periphery the lost excitability is restored. It is generally necessary for a severed nerve to be sutured. Even when this has been done it takes many months to recover.

Electricity is sometimes made use of to test the function of nerves. When these are injured the abnormal response obtained is known as the reaction of degeneration.

UPPER AND LOWER MOTOR NEURONES

Before the different kinds of paralysis can be understood, it is necessary to explain more fully how the nerve impulses in the body are controlled.

The nerves passing to and from the brain are arranged in what are called motor and sensory tracts.

A motor nerve has its origin on one side of the brain in the cerebral cortex. It crosses over to the opposite side in the medulla, and continues down the spinal cord. It is then carried by means of the spinal nerves to the various muscles which it is its particular function to supply. This explains

why a lesion involving the motor area of one side of the brain causes paralysis of the muscles on the opposite side of the body.

The motor tract, for purposes of study, is divided into two parts called the upper and lower motor tracts or neurones.

The Upper Motor Neurone comprises: the motor cell in the cortex of the brain, and its descending nerve fibre down to a cell in the spinal cord.

An efferent impulse passes from the nerve centre, causing a muscle to contract. Another set of fibres comes at the same time and inhibits or checks the contraction (inhibitory nerves). Interruption of the upper motor neurone stops the inhibition, and so the muscle continues to contract, and remains in a state of spasm. This explains the condition found in spastic paralysis. It is therefore a lesion of the upper motor neurone.

The Lower Motor Neurone includes the nerve cell in the cord, together with the nerve which proceeds to the periphery.

Lesions of the lower motor neurone are caused by some injury or disease of the spinal nerve cell, or the peripheral nerve given off from it. The control of muscle tone is altered and nutrition impaired. The result is a flaccid condition, combined with atrophy or wasting of the muscles concerned.

REFLEX ACTION

" Reflex action is the immediate efferent response to an afferent impulse, independently of the will, the disturbance set up by a stimulus to an afferent nerve being reflected along an efferent nerve to a muscle or gland " (*Thornton*).

Reflex actions are normally taking place continually in the body. Blinking of the eyelids, sneezing, and coughing are familiar examples.

There are some reflexes the performance of which are used by the physician for purposes of examination. These are called the deep reflexes. They are present in health to a certain degree, in disease they become obliterated or increased. If, with the knee flexed and the muscles relaxed,

a sharp tap is given over the ligamentum patellæ, the lower leg springs suddenly forwards and sinks again. This takes place independently of the will, and is normal in a healthy person. It is called the patella reflex.

If an inhibitory nerve is constrained in the upper motor neurone, reflex action is increased in the lower motor neurone. This accounts for the reflexes being increased in spastic paralyses. In flaccid paralysis the reflexes are absent.

PARALYSIS

“ By paralysis is meant the inability to move voluntarily a certain muscle or muscles, or to appreciate any of the ordinary sensory stimuli ” (*Taylor*).

CLASSIFICATION OF THE TWO TYPES OF PARALYSIS

INJURY OR DISEASE OF THE UPPER MOTOR NEURONES

1. Spastic muscles.

Caused by interference of control of movement in brain cortex.

2. Very slight wasting.

Any present is due only to disuse, for nutrition is not interfered with.

3. Normal appearance as regards circulation.

The nerves of the blood-vessels are normal.

4. Reflexes are increased.

The action of the inhibitory impulses is stopped.

5. Electrical reactions are normal.

6. Contractions may occur.

Due to adhesions, and the joint being held in flexed positions.

INJURY OR DISEASE OF THE LOWER MOTOR NEURONES

1. Flaccid muscles.

Muscles have lost tone, which is controlled in the spinal cells.

2. Marked wasting of muscles.

Nutrition is interfered with because the trophic centres in the cord are injured.

3. Cold and blue in appearance.

The nerves supplying the blood-vessels are affected.

4. Reflexes are abolished.

The connection between the nerve cells in the anterior and posterior horns of the cord is interrupted.

5. Electrical tests show reaction of degeneration.

6. Contractions may occur.

Due to the over-action of non-paralysed muscles.

AFFECTIONS OF THE UPPER MOTOR NEURONES

HEMIPLEGIA

" By ordinary hemiplegia is meant paralysis of the lower half of the face and tongue, and of the limbs on the corresponding side. The trunk muscles are also involved on the same side, though to a lesser extent than the affected limbs " (*Guthrie*).

This condition is usually caused by cerebral hæmorrhage or apoplexy, which either temporarily or permanently damages the upper motor tracts.

During the early stages of cerebral hæmorrhage the following symptoms occur:—Sudden loss of consciousness, stertorous breathing, cyanosis of face, hard high-tension pulse, hemiplegia and aphasia (loss or alteration in power of speech).

Treatment.—At first complete rest. The limbs must be kept in a good position, and the weight of the bedclothes should be kept off the foot. The whole limb should be rotated out and abducted, the foot dorsi-flexed and everted, to correct the tendency to take the opposite positions.

Adduction of the shoulder may be prevented by placing a sand-bag in the axilla. The elbow should be kept extended. The patient may be told to alter the position of the hand himself, with his good hand.

Note.—At this stage the limbs probably lie in a flaccid condition, later they may become spastic.

Massage Treatment.—As soon as any massage is ordered, give much effleurage over the limbs and careful passive movements in all the joints. The movements should be begun as early as possible to prevent adhesions which form very quickly round the joints. Later muscle kneading may be given. Tapotement should be avoided if muscles are spastic.

Massage for old-standing cases of hemiplegia differs somewhat from the above, but before giving it in detail several more points on the subject must be discussed.

It has been explained by scientists that the neurones

require stimulation for the performance of their functions, and that they depend upon the normal movements of the body for this stimulation. Tension of skin, muscles, tendons, and ligaments also affects them. If these normal processes are in abeyance as a result of paralysis, some artificial stimulation must be given in their place. Massage and passive movements are invaluable for this purpose. By their use in such cases atrophy is arrested, nutrition in the muscles is improved, the circulation of the blood and lymph increased, and stiffness in the joints prevented. The manipulations probably also have an effect upon the nerves and their centres.

In old-standing cases it is continually seen that certain muscle groups become more spastic than others, in fact the affected ones may become permanently contracted. "Muscle contracted in this way should never be forcibly stretched, but coaxed to relax by gentle, steady traction and much effleurage. Petrissage and tapotement stimulate the muscles to further contraction, and therefore should not be applied to those which are already in a hypertonic condition. On the other hand the above-mentioned manipulations are useful in improving the tone of the uncontracted muscles" (*Guthrie*).

Recovery of the Muscle Groups.—This takes place gradually, the proximal parts regaining their power before the distal, and usually the leg recovers before the arm. The flexors usually regain strength before the extensors. (When this is the case concentric and eccentric muscle work is necessary.)

If a large part of the cerebral tract has been destroyed, complete recovery can never take place, but in the worst cases some improvement may be gained by careful treatment, also by the patient's own efforts.

"Generally speaking, the less the spasticity and wasting, the better the prognosis. Motor paralysis is of less grave significance than spasticity" (*Guthrie*).

Order of Massage for Old-standing Hemiplegia.—Much effleurage on all muscle groups. Petrissage and kneading of the weak, stretched muscles (extensors). Frictions round the joints. Extra effleurage on the contracted muscles. Tapotement on the weak muscles (omitted if it increases spasm).

Passive movements in all the joints, with effleurage in between to relieve spasm. Active movements with concentric and eccentric muscle work for the weak muscles (extensors). These are often impossible, but must be urged as soon as the patient can do the least active movement.

The Re-education of Movement.—This requires much patience, and the masseuse should watch from day to day for the least sign of activity. She must continue passive movements, and at the same time urge the patient to move the limb.

The patient should learn frequently to abduct, rotate out, and evert the lower limb.

Foot-drop may be corrected by sitting with a strap round the foot, and pulling on the strap ; also by flexing the foot on the bar of a chair, or the lowest rung of a ladder. Walking must be practised, placing the paralysed limb forwards first, instead of dragging it behind. The support of an attendant is better than a stick or crutch, as it can be gradually lessened as the patient gains confidence.

INFANTILE HEMIPLEGIA

Hemiplegia occurs in children, and is sometimes due to an injury to the brain at birth.

It may also occur as a result of an acute febrile attack combined with unilateral convulsions. The side affected in the convulsions eventually becomes paralysed.

The parts affected by the paralysis are the same as in adults—face, arm, and leg, the arm generally being the worst. As the child grows, the paralysed limbs seem to become smaller ; this is because there is interference with development. Contractions are often seen, especially at the ankle.

Children suffering in this way are often mentally deficient.

Treatment.—Massage and movements may be given to keep up nutrition in the muscles, to reduce spasm, and to prevent contractions. See previous treatment of hemiplegia.

PARAPLEGIA

"Paraplegia is paralysis of the lower extremities, usually associated with paralysis of the lower part of the trunk, bladder, and rectum" (*Bastian*).

This condition occurs from a variety of causes, and there are several types. It is sometimes associated with tubercular disease of the spine, when it is the result of pressure on the cord. It may be due to organic disease of the spinal cord, or it may be purely functional.

The paralysis is usually of the spastic type, and there is generally incontinence of urine and fæces, owing to paralysis of the sphincter muscles.

Treatment.—Massage of the lower limbs may be given as for hemiplegia. Much effleurage to soothe muscle spasm. Petrissage and tapotement of the weak muscles. Passive movements to help mobility in the joints. Stretching of any contractions combined with effleurage.

CEREBRAL DIPLEGIA

Cerebral diplegia is a condition in which paralysis affects both sides of the body. There is motor weakness, bilateral rigidity, and sometimes perverse movements.

It is usually congenital, but the condition may develop in later childhood as the result of some illness. Mental deficiency is generally present.

Treatment.—The general health must be improved as much as possible by careful nursing, suitable diet, and warm clothing. Much care and patience is required to train the child mentally.

General massage and passive movements may be given to improve nutrition and circulation. Easy free exercises should be taught to help will power, concentration, and the co-ordination of movement. If deformities appear, these must be dealt with.

MULTIPLE OR DISSEMINATED SCLEROSIS

In this disease "isolated patches of sclerosis are found scattered about the central nervous system, both in the cord and brain" (*Hudson*).

Note.—Sclerosis is overgrowth of the connective tissue of an organ.

The condition is commonest in young adults, generally women with neurotic tendencies. It may occur without cause, but is also the result of exposure to cold and wet, mental shock or worry, and acute diseases.

Symptoms.—These vary according to the distribution of the patches of sclerosis. "Coarse tremors appear in the hand when the muscles are used—for instance, on picking up an object, or when the patient is asked to touch the tip of his nose with his forefinger. These are called intention tremors" (*Hudson*).

The speech becomes slow and staccato. Trembling of the eyeball. Increased knee-jerks. The legs may become spastic, and the sphincter muscles of the bladder and rectum are sometimes affected. The mental condition becomes weak, and the patient is emotional. The progress of the disease is slow and extends over a period of 5 to 10 years.

Treatment.—Cure is impossible, but symptoms may be relieved. The general health of the patient must be maintained as far as possible.

Massage may be given to improve the circulation and the nutrition of the nervous system. Vibrations and soothing strokings are the only manipulations given down the spine.

AFFECTIONS OF THE LOWER MOTOR NEURONES

PROGRESSIVE MUSCULAR ATROPHY

Progressive muscular atrophy is "a slow wasting of the muscles, beginning in some particular part, spreading and increasing until it is wide in extent and extreme in degree. The changes in the muscles depend upon a slow degeneration in the ganglion cells of the anterior cornua of the spinal cord, accompanied by a degeneration in the motor nerve fibres arising from the cells. With this degeneration of the cells and fibres there is usually also associated a similar change in the pyramidal tracts of the cord, sometimes at least to be traced up to the motor cortex of the brain, and related to a similar degeneration of their ganglion cells" (*Gowers*).

This is a rare disease of adult life, and is seen more often in men than in women.

The causes are : mental distress, exposure to cold, injury (rarely), lead poisoning, and syphilis.

Symptoms.—Wasting of the muscles. This usually begins in the small muscles of the hand, viz. the thenar eminence and the interossei. Then the wasting gradually spreads up the arm to the shoulder and trunk. Lastly the legs are attacked, but the head remains unaffected. The muscles become weak and flaccid. There are vague pains in the affected parts. Twitchings and tremors may occur. Numbness may be complained of, but there are no real sensory changes. The course of the disease extends over many years.

Treatment.—This disease is incurable, but symptoms may be alleviated by attention to general conditions. The patient should have fresh air and gentle exercise, and mental worries should be avoided.

Massage may be given gently to the affected parts. Effleurage, muscle kneading, nerve vibrations, hacking down the spine, and passive movements. The patient should never be over-tired by the treatment.

ANTERIOR POLIO-MYELITIS OR INFANTILE PARALYSIS

Anterior polio-myelitis is a fairly common disease which attacks children generally between the ages of eighteen months and two years. It is due to a definite micro-organism which causes inflammation in the anterior grey matter of the spinal cord. "Myelitis" means inflammation of the cord.

It is an affection of the lower motor neurones, for the cells in the spinal cord either temporarily or permanently lose their function, and the peripheral nerves given off from them are consequently paralysed.

The disease is commoner in boys than in girls, and although it usually appears in isolated cases, there are several well-known examples when epidemics have occurred.

The illness generally begins with a chill and feverish attack. There may be loss of consciousness, convulsions, and vomiting.

Pain in the limbs is sometimes present. These early symptoms continue for a variable time from 1 day to 2 weeks, or they may be entirely absent. Then the paralysis comes on.

The following changes occur :—Acute inflammation in the anterior poles of the grey matter of the spinal cord. Fluid is exuded into the surrounding tissues, causing pressure. If the fluid is soon absorbed, the pressure ceases and the parts recover. Sometimes the nerve cells are destroyed, then the part can never recover. After the inflammation has subsided, definite scars are left upon the nerve tissue. If the inflammation continues, there is degeneration of the nerve fibres given off from the cells, the muscles they supply rapidly waste and subsequently undergo fatty degeneration. The paralysis depends upon the amount of the inflammation. It may be slight or extensive, but it is characteristic of the disease that it is worst in the early stages. It is seldom that all parts of the body remain permanently affected, and it is rare that all muscle groups entirely recover, but when a part has recovered it does not become repara lysed.

The cervical and lumbar regions are the parts of the cord most often affected, resulting in paralysis of the extremities.

The parts which remain paralysed are very variable. Sometimes a whole limb, sometimes one muscle group, or a single muscle.

When the acute and early symptoms have subsided, the following signs will still be present :—

Paralysis with flaccid and wasting muscles. The affected parts are cold, and sometimes blue in appearance. The reflexes are lost. There is reaction of degeneration when the muscles are tested by electricity.

For purposes of treatment, cases of anterior polio-myelitis may be divided into three groups :—

(a) Those that recover without treatment. It has been seen that some muscles generally recover soon after the acute stage. This is probably due to the absorption of effusion, and so pressure is arrested.

(b) Those that can never recover. If the nerve cells in the cord have been destroyed, the parts supplied remain permanently paralysed.

(c) Those that only recover with careful treatment.

In many cases it has been found that although the part remains paralysed, the cells in the cord are not permanently destroyed. This is proved because after treatment the muscles recover their power. Some very long-standing cases have been seen to improve. An important factor helping in this recovery is the position of the paralysed limb. The affected muscles should be so placed that they are permanently relaxed, for a muscle kept in a stretched position has a far less chance of recovery than one which is always relaxed. It is therefore often necessary to use some apparatus, *e.g.* a splint, to ensure this relaxation. Rest is another important factor, and fixation on a splint is also useful to attain it.

After-effects.—Deformities are too often the result of anterior polio-myelitis. This is on account of some muscles recovering their power and over-acting against the paralysed ones. Contractions occur in this way. Scoliosis, and all forms of talipes are seen. Sometimes there is a flail limb, *i.e.* the whole limb remains paralysed, and the patient cannot control it.

Treatment.—In the early stages the patient should be isolated from other children, kept quiet and very warm. The limbs should be wrapped in cotton wool, and kept in a good position.

Massage is not begun till the acute stage is past, and when ordered must be very gentle. It is easy to bruise the tissues when in this condition, and throughout the whole course of the treatment the manipulations should never be hard or rough. It is often well to use a lubricant. During treatment the limb should be held in a good position, never allowing paralysed muscles to stretch. Effleurage, petrissage of muscles, and frictions round the joints are given. Vibrations and tapotement should not be given till six weeks after the acute symptoms have subsided, and the latter is avoided if painful.

Passive movements are given from the first, with care not to over-stretch paralysed muscles, at the same time watching for contractions which must be dealt with. Active move-

ments are added as soon as there is any sign of power to do them. The patient should be urged to try to move the part, at first with help, later without, and last of all adding a little resistance.

The affected limbs should be kept very warm. Advise two stockings, hot-water bottle, etc. Whenever possible, make the limb quite warm before beginning massage. The treatment has often to continue for weeks, months, or even years. If a splint is worn between the treatments, the bandages must be carefully fixed, *i.e.* no creases at the ankles, also guard against pressure sores on the heel.

CHAPTER XVII

AFFECTIONS OF LOWER MOTOR NEURONES, *continued*—INJURIES OF NERVE TRUNKS:—*Of the upper extremity*: Injuries to the brachial plexus—Erb's paralysis—Crutch paralysis—Drunkard's paralysis—Injury to the circumflex nerve—Injury to the median nerve—Injury to the ulnar nerve—Injury to the musculo-spiral nerve—Positions of rest and massage for injuries to the brachial plexus—circumflex, median, ulnar, and musculo-spiral nerves—*Injuries to nerves of the lower extremity*: The anterior crural nerve—The obturator nerve—The external popliteal nerve.

AFFECTIONS OF NERVE TRUNKS

OF THE UPPER EXTREMITY

INJURIES TO THE BRACHIAL PLEXUS

INJURY to the brachial plexus may be the result of violent traction of the arm during an accident: it may take place when a dislocated shoulder is reduced, or be the result of gun-shot and other wounds. The whole or part of the plexus may be damaged. If the former there is complete paralysis of the upper limb, combined with loss of sensation up to the shoulder. In the latter, the condition will vary according to which nerve roots have received injury, and some of these must now be considered.

Erb's Paralysis.—When some of the spinal roots forming the brachial plexus are injured, the muscles gaining their nerve supply from those roots become paralysed. Those commonly affected simultaneously are deltoid, biceps, brachialis anticus, and supinator longus. Sometimes the spinati and supinator brevis are also involved.

The causes are: injury, rheumatic neuritis, or pressure by a tumour.

Another form is obstetrical paralysis, seen in newly born

children. It occurs after pressure with the forceps on the brachial plexus, or in breech presentations from severe traction on the shoulder.

Symptoms.—In both forms there is loss of power immediately after injury. The humerus hangs straight down, and when lifted, drops like a flail. It is adducted and rotated inwards. The elbow is kept extended and the forearm pronated. The patient cannot flex the elbow or supinate the forearm.

Crutch Paralysis.—Caused by the pressure of a crutch on the brachial plexus in the axilla. The musculo-spiral nerve is the one most frequently involved.

Drunkard's Paralysis.—The result of pressure on the brachial plexus, which takes place while the patient is in a profound sleep, and under the influence of alcohol; e.g. a man who falls asleep with his arm hanging heavily over the back of a chair.

Injury to the Circumflex Nerve.—On account of its position round the surgical neck of the humerus this nerve often becomes involved in fractures of the bone and dislocations of the shoulder-joint. Such injuries cause paralysis of the deltoid muscle, and there may be loss of sensation of the skin covering the shoulder-joint.

Injury to the Median Nerve.—Often caused by cuts, fractures, gun-shot wounds, etc.

It must be remembered that the nerve supplies the following muscles:—All the superficial flexors of the forearm, except flexor carpi ulnaris. Its branch, the anterior interosseous nerve, supplies the deep flexors of the forearm except the inner half of flexor profundus digitorum. It also gives branches to some of the thumb muscles, and the first and second lumbricales.

The sensory branches supply the palmar surface of the thumb, the index and middle fingers, and half the ring finger. These branches also extend to the dorsal surface of the same fingers to a little below the level of the nails.

When the nerve is injured, some or all of the following symptoms may be present:—Loss of flexion of the second phalanges of all the fingers. Loss of flexion of the terminal

phalanges of the middle and index fingers. The thumb cannot be flexed or opposed, and is maintained in a position of extension and adduction. Loss of pronation of the hand (except the amount performed by brachio-radialis).

Sensation is lost or impaired in the regions of the hand mentioned above as supplied by the nerve.

Note.—Although flexion of the wrist may be impaired, this movement can still be performed by muscles supplied by the ulnar nerve.

Injury to the Ulnar Nerve.—Owing to its superficial position at the elbow and wrist, the ulnar nerve is very liable to injury.

It supplies the following muscles:—Flexor carpi ulnaris, the inner half of flexor profundus digitorum. Its deep palmar branches supply all the interossei, and the two inner lumbricale muscles, as well as those forming the hypothenar eminence, and a muscle which adducts the thumb.

The sensory branches supply both palmar and dorsal surfaces of the ulnar border of the hand, both surfaces of the little and half the ring fingers.



FIG. 53.—CLAW-HAND FROM ULNAR PARALYSIS.

*By permission, from Rose & Carless's "Manual of Surgery"
(Baillière, Tindall & Cox, London).*

When the nerve is injured, some or all of the following symptoms may be present:—Loss of power of ulnar flexion of the wrist, as flexor carpi ulnaris is paralysed. The hand is consequently drawn to the radial side. The interossei are paralysed, therefore it is impossible to spread out the

fingers, and the dorsal and palmar surfaces of the hand appear wasted. The fingers, specially the ring and little fingers, cannot be flexed at the metacarpo-phalangeal joint, or extended at the inter-phalangeal joints. This is also because of paralysis of the interossei. The opposing muscles continue to work, and in consequence the hand assumes a typical "claw shape."

There is loss of power of flexion in the little and ring fingers, and the thumb cannot be adducted. The muscles of the hypothenar eminence become wasted. Sensation is lost or impaired in the region of the hand supplied by the nerve as given above.

Injury to the Musculo-spiral Nerve.—This nerve is more liable to injury than any other nerve in the arm. When paralysed it produces the condition known as "wrist-drop." The nerve lies close to the humerus in the musculo-spiral groove, and it is here that it may be torn, or involved in the callus of a fracture. It is also liable to bruises from its exposed position, and it may be cut when a wound is made in the arm.

The nerve supplies the following muscles:—Triceps, anconeus, brachio-radialis, extensor carpi radialis longior, and



FIG. 54.—WRIST-DROP.

*By permission, from Rose & Carless's "Manual of Surgery"
(Baillière, Tindall & Cox, London).*

brachialis anticus. In front of the elbow the nerve divides into the posterior interosseous and radial nerves. The posterior interosseous passes again to the back, piercing the fibres of the supinator brevis muscle. It continues down the back of the forearm, and supplies all the muscles on the

radial side and the back of the forearm except anconeus, brachio-radialis, and extensor carpi radialis.

The sensory branches of the musculo-spiral nerve supply a considerable area on the back of the arm.

The radial nerve is purely sensory. It supplies that part of the posterior surface of the wrist, hand, fingers, and thumb which is not supplied by the ulnar and median nerves, viz. the back of the hand, thumb, index and middle fingers, and half the ring finger.

When the musculo-spiral nerve is paralysed, the hand is flexed at the wrist and lies flaccid. The fingers are flexed, and if an attempt be made to extend them, only the two last phalanges will move, and this occurs through the action of the interossei muscles. It is impossible to extend the wrist.

If the arm is extended, supination is lost ; if it is flexed, the movement can be done by biceps. If the nerve lesion is high up, extension of the elbow is impossible because triceps is paralysed.

Treatment.—During recovery of any of these conditions the posture of the limb is of great importance. All affected muscle groups must be kept entirely relaxed, and it is customary for the limb to be supported by an apparatus to ensure this relaxation and rest for the paralysed parts. The limb is usually removed from the support during treatment, but the rest position should be maintained throughout, and appliances readjusted with care when treatment is ended. Massage of the whole of the upper extremity should be given for conditions resulting from injury to the brachial plexus.

Effleurage from hand to shoulder and down side of neck. Petrissage of the muscle groups, giving special attention to paralysed ones, and avoiding those where contractions are appearing. Frictions round shoulder, elbow, and wrist-joints, also upon the hand and fingers. Vibrations over the brachial plexus, and down the arm with one or both hands. Running vibrations and vibration pressures on the affected nerves. Hacking and clapping upon the paralysed muscles.

Passive movements in all joints, with care not to overstretch paralysed muscles. The earliest sign of active movement must be noticed and encouraged.

Injured Circumflex Nerve.—To maintain the position of rest the arm is abducted from the shoulder and fixed in a horizontal position. Massage of the shoulder and upper arm is given, paying special attention to the deltoid muscle. The arm is not allowed to assume the normal position of adduction for a considerable time. Movements may be given in elbow, wrist, and hand, and later when the shoulder is brought down, abduction may be added with concentric and eccentric muscle work.



FIG. 55.—METHOD OF EFFECTING REST IN MEDIAN NERVE PARALYSIS.

By permission of the Author and Publishers, from "*The Action of Muscles*,"
by W. Colin Mackenzie. London: H. K. Lewis & Co., Ltd., 1918.

Injured Median Nerve.—The position of rest should include, over pronation of the forearm, flexion of the wrist and fingers, and flexion of the thumb at the inter-phalangeal and metacarpo-phalangeal joints.

The whole arm is treated by massage, but special attention given to the following :—

Muscles on the anterior surface of the forearm and hand. The thenar eminence, and the palmar surface of the thumb, index and middle fingers. Running vibrations down the course of the nerve. If scar tissue, adhesions, or contracted

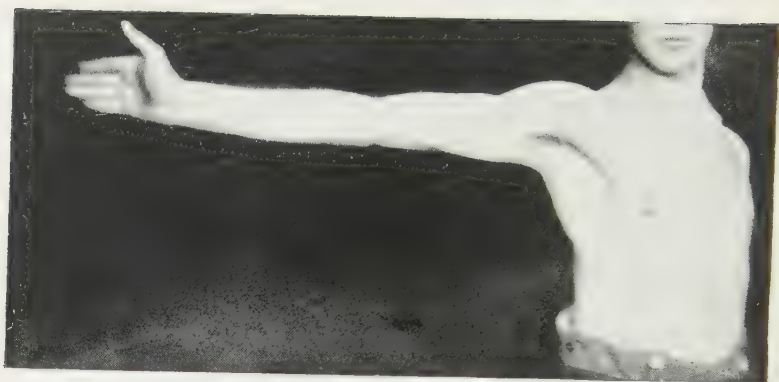


FIG. 56.—POSITION FOR IMMEDIATE REST IN MUSCULO-SPIRAL PARALYSIS.

By permission of the Author and Publishers. From "The Action of Muscles," by W. Colin Mackenzie. London: H. K. Lewis & Co., Ltd., 1918.

tendons are present, extra frictions and passive movements must be given.

Flexion of the index finger, and flexion and abduction of the thumb require special attention.

Injured Ulnar Nerve.—The position of rest should include flexion of the elbow and wrist. The thumb should be adducted across the hand, the fingers flexed at the metacarpo-phalangeal joints and extended at the inter-phalangeal joints. The hand should be supported midway between pronation and supination. A special splint is worn to maintain these positions at the various joints.

The whole arm is treated by massage, but special attention given to the following :—Flexor muscles on the ulnar border of the forearm. The hypothenar eminence, and both surfaces of the ring and little fingers. Running vibrations down the course of the nerve.

Passive movement and stretching to prevent contraction of the ring and little fingers. Active wrist movements to improve volar and ulnar flexion.

Injured Musculo-Spiral Nerve.—The position of rest is one of abduction at the shoulder-joint, and extension of the elbow. The forearm is placed midway between pronation and supination, and the wrist is hyper-extended. The thumb and fingers are fully extended. This position is maintained by a special splint. The whole arm is treated by massage, but special attention given to the following :—Triceps, brachioradialis, and all the extensor muscles of the forearm. The back of hand and fingers. Running vibrations down the course of the nerve.

Passive movements, but never over-stretching the extensors at the wrist. Active movements as soon as possible, with concentric and eccentric work for the extensors.

INJURIES TO NERVES OF LOWER EXTREMITY

Anterior Crural Nerve.—This nerve is sometimes injured, but it is more frequently paralysed as the result of infantile paralysis.

It supplies the muscles on the front of the thigh, and when paralysed flexion at the hip is incomplete, because

iliacus is affected. Extension of the knee is lost because the quadriceps femoris is paralysed. Sartorius and pectineus are also affected.

Treatment.—Massage of the hip, thigh, and knee.

Effleurage, petrissage, frictions, vibrations, hacking, clapping. Passive movements, and active resisted movements as soon as possible.

Obturator Nerve.—This nerve supplies the knee-joint. It also gives a branch to the hip, and in the early stages of tubercular hip disease the patient complains of pain, not in the hip itself, but on the inner side of the knee and in the joint. This is due to the obturator nerve supplying both joints.

Massage is unsuitable in such cases, but might be given when the nerve is paralysed with other in its neighbourhood, *e.g.* for infantile paralysis. •

Injury to the External Popliteal Nerve.—The external popliteal nerve is liable to injury from blows, cuts, wounds, etc., owing to its exposed position. When the muscles it supplies are paralysed, the condition known as "foot-drop" is produced.

The nerve is a branch from the great sciatic. The latter divides in the popliteal space, and its smaller branch, viz. the external popliteal, passes out towards the head of the fibula. Behind this prominence the nerve can be felt beneath the skin. It then winds round the neck of the bone and passes down the leg. It soon divides into two branches, the anterior tibial and the musculo-cutaneous nerves. Before dividing, the nerve gives a sensory branch to the region of skin on the outside of the knee, and also a branch to the joint.

The anterior tibial nerve passes down the front of the leg, lying between the tibia and fibula. It supplies tibialis anticus, extensor longus digitorum, peroneus tertius, and extensor proprius hallucis. A small branch also goes to extensor brevis digitorum.

The musculo-cutaneous nerve gives the supply to peroneus longus and brevis, and the sensory supply to a large area down the anterior aspect of the leg and foot.

When the above-mentioned muscles are paralysed, dorsal flexion of the ankle and toes, also eversion of the foot, are impossible. Talipes varus sometimes results from this condition.

Treatment.—A splint is often applied to keep the foot at a right angle and so prevent deformity. Massage is given to the lower leg and foot. Effleurage, petrissage, frictions, vibrations on the nerves. Hacking and clapping.

Passive movements in ankle and foot. Active movements with concentric and eccentric muscle work for the dorsal flexors as soon as possible.

When the patient lies in bed, the weight of the bedclothes should be taken off the foot.

CHAPTER XVIII

AFFECTIONS OF THE LOWER MOTOR NEURONES, *continued*:—DISEASES OF NERVE TRUNKS—Neuritis and neuralgia—Sciatica—Coccydynia—Metatarsalgia—Intercostal neuralgia—Tri-geminal neuralgia or Tic douloureux—Facial paralysis or Bell's palsy—Post diphtheritic paralysis.

DISEASES OF NERVE TRUNKS

NEURITIS AND NEURALGIA

“NEURITIS is inflammation of a nerve, or of the fibrous sheath of a nerve” (*Bastian*).

This condition appears when a patient is in a lowered state of health. It may also be caused by cold, injury, pressure from inflammatory products, gout, rheumatism, kidney disease, diabetes, alcoholism, and some forms of poisoning.

There is pain and tenderness along the course of the nerve trunk and its branches. The nerve is sometimes swollen and can be felt. There is atrophy of the muscles of the affected part, and much weakness of the limb. Sensations may be increased or diminished. If the inflammation is in the nerve substance, symptoms of paralysis may be present.

Neuralgia is pain in the course of a nerve and its branches. The causes and symptoms are much the same as in neuritis, but less severe. The pain occurs in attacks and is seldom continuous.

Treatment.—The patient's general condition requires attention. Rest is essential for the affected part.

Massage, when ordered for neuritis, must be administered with great care, and not until acute symptoms have subsided somewhat.

CERVICO-BRACHIAL NEURITIS OR NEURALGIA

“The nerves of the brachial plexus and the posterior branches of the four lower cervical nerves are here concerned” (*Buzzard*).

There is pain in the neck and shoulder region, as well as down the course of one or more of the nerve trunks of the arm.

Painful points may be found in the axilla, over deltoid, at the elbow in the grooves where the ulnar nerve passes between the inner condyle and the olecranon process, and at the point where the radial nerve becomes superficial. The ulnar nerve is the trunk most often affected.

Treatment.—Rest is very important; the arm should be carried in a sling, and kept very warm.

During treatment by massage the arm must be well supported. Effleurage of the whole limb from hand to shoulder, also down the side of the neck. Vibrations with the whole hand all over the brachial plexus and affected areas. Running vibrations down the nerve trunks. Gentle frictions down the nerve trunks, the object of the manipulations being to get rid of adhesions which are the product of inflammation in the nerve sheath. Gentle kneading of all the muscle groups. Passive movements in all the joints.

Nerve stretching. This is done by the masseuse grasping the patient's hand, with the arm stretched. A gentle traction out or upwards is given to the limb. 2 to 6 times.

Time for treatment, 15 to 35 minutes daily.

Note.—In the early stages of treatment effleurage may be painful. If the patient complains it should be stopped, and much vibration given instead.

SCIATICA

Sciatica is neuralgia in the course of the sciatic nerve, or inflammation (neuritis) of the sheath of the nerve. The general causes are the same as those given for neuritis. The special causes are tumours within the pelvis, disease of the ovaries or uterus, carcinoma of the rectum, osteo-arthritis of the hip-joint, or a loaded rectum.

In sciatic neuralgia the pain is intermittent, and no wasting of the muscles is seen. This form is commonest in women and is generally caused by over-fatigue or worry.

In neuritis or inflammation of the nerve sheath, the pain is more severe; there may be marked wasting, and loss of power in the muscles. In bad cases, reaction of degeneration is found when the muscles are electrically tested. This form is commonest in men. It is caused by exposure to cold, damp, etc., and is sometimes combined with gout.

Symptoms.—True sciatica is one-sided only. There is pain and aching in the lumbar region, and down the back of the leg. The patient has difficulty in bending forwards. There may be tender thickenings in the muscles.

The following tender points down the course of the nerve may be noticed:—

1. As it passes out of the sciatic notch.
2. Midway between the tuberosity of ischium and the great trochanter, just below the gluteal fold.
3. As the nerve passes from under the biceps muscle, half-way down the thigh.
4. In the popliteal space.
5. In the middle of the calf.
6. Midway between the inner malleolus and the lower border of the foot.
7. In the centre of the sole of the foot.

Treatment.—In the early stages, warmth and rest in bed are essential. Hot applications, splint, blister, etc.

Massage should be very gentle at first, and gradually increased in strength and amount. The patient should lie prone if possible, but if this is too painful, he must lie on his side.

For the lumbar region: Effleurage, vibrations, frictions, and kneading.

For the gluteal region: Effleurage, vibrations, frictions, and kneading.

For the back of the leg and thigh: Effleurage from ankle to the gluteal fold. Vibrations with the whole hand over the painful area. Running vibrations with the finger-tips down the course of the nerve. Frictions with the finger-tips



FIG. 57.—STRETCHING THE SCIATIC NERVE.



FIG. 58.—KNUCKLE-FRICTIONS OF THE SCIATIC NERVE.

down the nerve. These must be very gentle at first, but gradually increased in strength as the patient can bear them ; if a very deep friction is required, sometimes the knuckles are used. The object of the manipulation is to get rid of adhesions which are the product of inflammation in the nerve sheath. Gentle muscle kneading. Soothing stroking down the course of the nerve from hip to ankle. Passive movements in all the joints from ankle to hip in the supine position.

Nerve stretching. This is done by the masseuse grasping the patient's ankle, and keeping the knee extended, she gradually raises the leg towards a right angle with the body. 2 to 4 times. The object is to stretch adhesions in the nerve sheath.

Time for treatment, 30 to 40 minutes.

The above scheme requires modification according to the strength and condition of the patient. At the beginning it is often well to give no movements. The patient is often unable to bear effleurage, and when this is the case vibrations must be used instead. Later, when improvement is maintained, stationary nerve pressures and active movements may be added. In severe cases the patient holds the knee semiflexed. In this position there is the least tension on the nerve.

COCCYDYNIA

Coccydynia is neuralgic pain in the region of the coccyx. It may be caused by fracture or displacement of the bone, or by diseases of organs and structures in its neighbourhood.

Massage may be given if the pain is of neuralgic origin. At first it should be soothing, but the strength should be gradually increased. Effleurage, vibrations, and frictions are given over the painful area.

Time for treatment, 10 to 20 minutes.

METATARSALGIA

Metatarsalgia is neuralgic pain in the feet, in the region of the heads of the metatarsal bones. The pain may extend up the limb.

The condition is seen in gouty and rheumatic subjects, or is caused by injury. It may occur with flat foot.

It is probably due to compression of the nerves of the foot between the heads of the metatarsal bones and the ground. Corns often appear on the sole of the foot. The pain is increased by walking, and occurs in characteristic attacks.

Massage of the feet and legs does much to alleviate the condition. Passive and active movements should be given, specially plantar flexion of the foot and toes given concentrically and eccentrically. Raising on to the outer borders of the feet should also be done as a free exercise, first in sitting and later in standing position.

INTERCOSTAL NEURALGIA

Neuralgia may be present in any of the dorsal nerves. The pain, which occurs at intervals, is confined to one side, generally the left.

The condition may be caused by cold, rheumatism, overstrain, disease of the vertebræ, etc.

Symptoms.—There is pain in the course of the nerves, more frequently in the front and sides than at the back. There is often pain when breathing or coughing. There may be tender points close to the spine, sternum, and in the mid-axillary line.

Treatment.—Massage of the back and chest. Give much effleurage and vibration over the painful areas. Running vibrations and frictions over the nerves and intercostal muscles. Gentle muscle kneading.

Time for treatment, 15 to 30 minutes.

TRI-GENITAL NEURALGIA OR NEURITIS. TIC DOULOUREUX OR NEURALGIA OF THE 5TH CRANIAL NERVE

The tri-ge-minal is the largest of the twelve cranial nerves. It has three branches, hence its name. They are: the ophthalmic, the superior maxillary, and the inferior maxillary.

Sometimes one and sometimes two of these branches, but rarely all three together, are affected with neuralgia. The pain is very severe, and usually occurs in paroxysms. It is

often preceded or followed by neuralgia in other districts, especially in that of the occipital nerve. This condition may be combined with rheumatism of the neck muscles.

If the ophthalmic branch is affected, there is tenderness over the supra-orbital notch, and pain over the forehead and scalp, also round the eye and nose.

If the superior maxillary is affected, there is tenderness at the infra-orbital notch, and in the region of the malar bones.

If the inferior maxillary is affected, there is tenderness at the dental foramen, pain over the parietal and temporal bones, and in the region of the ears, lower jaw, and tongue.

Treatment.—Neck massage. The patient sitting, leaning slightly forwards, and having her head supported:—

Effleurage, vibrations, and frictions specially of the great occipital and great auricular nerves if affected. Gentle kneadings of muscles.

The front of the neck and throat. The patient sitting, the masseuse standing behind:—Much effleurage over the jugular veins.

The face. The patient sitting with head well supported:—

Effleurage over the course of the veins. Stroking, vibrations, and frictions over all the affected nerves. Much soothing stroking over all the face. Frictions of the scalp may also be given in some cases.

Note.—A stationary pressure on a nerve will sometimes relieve pain, but the whole treatment is usually given between the attacks of pain.

FACIAL PARALYSIS OR BELL'S PALSY

Bell's palsy is due to paralysis of the 7th cranial nerve, resulting generally in paralysis of one half of the face. Both sides are seldom affected. It is caused by exposure to cold, shock, pressure, fracture of the base of the skull, operation for mastoid abscess, etc.

The 7th cranial nerve has both motor and sensory branches.

The motor part supplies the muscles of expression of the face, the scalp, the pinna of the ear, buccinator, platysma, the stylo-hyoid, and the posterior belly of the digastric muscle.

It also contains some fibres which constitute the vasodilator nerves of the sub-maxillary and sub-lingual glands.

The sensory part contains some fibres of taste to the tongue.

Symptoms.—The wrinkles on the skin become less marked on the affected side. The eyelids cannot be brought together. (The eye remains open during sleep.) In smiling, the lips are displaced to the healthy side. The nostril on the affected side cannot be dilated. Food accumulates between the jaw and cheek, owing to the relaxation of buccinator. The naso-labial fold is less marked on the affected side. Whistling is impossible, owing to paralysis of half the orbicularis muscle. The condition comes on in a few hours, or it may take three or four days. In cases which recover, some return of power takes place in from a week to two months. Improvement generally begins in the upper part of the face.

Treatment.—The manipulations must be of a stimulating nature. Effleurage, frictions, vibrations on the affected side of the face, specially over the course of the nerve as it passes out of the stylo-mastoid foramen. (There may be tenderness where it emerges from the foramen.) Kneading and picking up of cheek muscles, and frictions, the masseuse placing one or two fingers inside the patient's mouth for some of the frictions. Hacking. Effleurage and gentle frictions on the eyelid.

Time, 20 to 30 minutes daily.

POST DIPHTHERITIC PARALYSIS

Paralysis is a common complication of diphtheria. It usually appears two or three weeks after the fever has subsided, but the time of its onset is variable. Older patients are more liable to become paralysed than young ones.

The soft palate is the first part affected usually, and then the eyes. Later the limbs are attacked, generally the legs first, and then the arms. The patient complains of tingling feelings, "pins and needles," or actual pain in the parts attacked, and then the paralysis comes on slowly. It is not often complete, but enough to make the muscles useless.

The muscles are flaccid, and soon begin to waste. All reflexes are lost. There are changes in sensation. Almost every part of the body may be attacked. Sometimes the intercostal muscles and the diaphragm are affected, so that respiration becomes difficult or impossible.

Generally the paralysis recovers in one part while it progresses in another, and as a rule it does not return to a part which it has left.

The average time for the paralysis to last is 6 to 8 weeks, but it may continue in the limbs for from 4 to 6 months.

Treatment.—Rest in bed, until definite improvement is seen. If massage is ordered, it should be applied gently to the affected muscles; chiefly effleurage and muscle kneading to improve nutrition, and passive movements to help the circulation. The patient should not be over-tired.

CHAPTER XIX

AFFECTIONS OF THE SENSORY TRACTS :—Locomotor Ataxy. AFFECTIONS OF BOTH MOTOR AND SENSORY TRACTS :—Chronic transverse myelitis—Friedreich's ataxia,

AFFECTIONS OF THE SENSORY TRACTS

LOCOMOTOR ATAXY OR TABES DORSALIS

“ A DISEASE of the spinal cord alone, or of the spinal cord and peripheral nerves ; manifested when considerable by inco-ordination of movement, peculiar pains, defective sensibility, and loss of muscle reflex action ” (*W. R. Gowers*).

Men suffer more frequently from this disease than women. It is nearly always a result of syphilis. Only a small proportion of cases are known to have arisen from other causes. The condition appears at a variable time—I to 20 years after the patient has been first affected by syphilis.

“ There is sclerosis of the posterior columns of the spinal cord and the posterior nerve roots. There are also changes in the peripheral sensory nerves ” (*Hudson*).

Symptoms.—These are divided into three stages :—

Stage I.—There are changes in sensation—lightning pains in feet and legs ; “ girdle sensations ”—like a constricting band round the waist. The knee jerks are lost. The pupil reflex to light is lost.

Stage II.—Called the ataxic stage. All the previous symptoms are present. A characteristic gait is developed with loss of co-ordination of movement. The patient lifts his legs too high, throws them out and stamps when putting his foot to the ground. He has a sense of walking on cotton-wool, no sense of balance, and he cannot walk in the dark. Other symptoms develop later, one of these being a swelling

of the joints. The knee is often affected, it becomes swollen, filled with fluid, and finally undergoes changes resembling those of osteo-arthritis. This is known as a Charcot's joint.

Stage III.—All the symptoms increase. The patient becomes paralysed and totally bed-ridden.

The disease lasts for many years; death usually takes place due to some cause such as pneumonia or tuberculosis.

Treatment.—The symptoms may be relieved by massage and exercises. The general circulation and the nutrition of the nervous system may be much helped.

Muscle kneadings, nerve vibrations, and frictions may be given. Special vibrations down the spine. Abdominal treatment is often beneficial.

Fraënkel's Exercises are specially arranged in a system for patients suffering from locomotor ataxy, and if regularly carried out are very helpful.

AFFECTIONS OF BOTH MOTOR AND SENSORY TRACTS

INFLAMMATION OF THE SPINAL CORD : CHRONIC TRANSVERSE MYELITIS

Transverse myelitis is inflammation of the spinal cord, affecting a whole transverse section of the cord.

In the chronic form the nerve tissue is replaced by connective tissue. Any part of the cord may be affected, but it is commonest in the dorsal region.

This disease appears sometimes without apparent cause, but it is also due to sudden chills, emotional disturbances, certain acute fevers, inflammation of the pelvic organs, and syphilis.

Symptoms.—Numbness and tingling in the legs, followed by weakness and later paralysis. Changes in sensation. The reflexes are usually lost at first, and later become greatly increased. The limbs become spastic. The sphincters are involved, and there is incontinence of urine and fæces.

Treatment.—It is impossible to cure this disease, but symptoms may be relieved by good nursing, suitable diet, and drugs.

Massage may be given to improve the circulation and

the nutrition of the nervous system. Effleurage, muscle kneading, to the limbs and passive movements. Only vibrations and soothing stroking should be given down the spine.

FRIEDREICH'S ATAXIA

Friedreich's ataxia is a nervous disease which has been described as intermediate between locomotor ataxy and disseminated sclerosis. It seems closely allied to both, though it is more like the latter than the former.

It is a disease of early life, appearing during childhood, and up to the twenty-fifth year. It is not strictly speaking an hereditary disease, but several members of the same family are often affected.

"The disease is dependent upon the development of areas of sclerosis in the posterior, and in the antero-lateral columns of the cord, as well as in some parts of the grey matter" (*Bastion*). There are no special causes of the disease.

Symptoms.—There is gradual progressive weakness in one or both legs, combined with a characteristic gait, like the swaying of a drunken man. Later the weakness extends to the arms, and the movements become tremulous. The knee-jerk is lost, and as the disease progresses deformities arise, such as pes cavus and curvature of the spine. Later other symptoms appear.

The course of the disease is very slow, from 5 to 30 years, but it always proves fatal.

Treatment.—Nothing is of much avail. Massage may be helpful to keep up general nutrition. Balance exercises to help co-ordination, and the deformities which arise should be counteracted.

CHAPTER XX

NERVOUS DISEASES, *continued*:—Temperament—The nervous temperament—Functional nervous diseases—Neurasthenia—Hysteria—Neuroses—The neurosis of occupation—Writer's cramp—Paralysis agitans—Chorea or St. Vitus's dance.

TEMPERAMENT

THE study of temperament dates back to very ancient times. It seems that the term when first used denoted the connection between a physical and a mental condition, but at present the word is used in a somewhat vague way to denote mental characteristics only.

The ancients considered two groups of four qualities, viz. hot, cold, dry, moist ; and fire, air, earth, and water. From a mixture or "tempering" of these they devolved the four temperaments found in human beings. They are—the sanguine, the melancholic, the choleric, and the phlegmatic. To these a fifth has been added—the nervous temperament, and it is with this last that we are here mostly concerned.

THE NERVOUS TEMPERAMENT

The study of temperament is important to those who have charge of nervous patients. The subject is so large that it cannot be fully considered here. There are excellent books which should be studied by those taking up this important branch of nursing, or when treating this class of patient by massage.

People are often described as "neurotic." This signifies a nervous condition, but the term is often used in speaking of a selfish, irritable patient who cannot get her own way. Care must be taken to distinguish between such a case and a purely nervous one. The nurse and masseuse require

endless patience, tact, and kindness. If the patient has confidence and likes the masseuse, the latter may have an unbounded power for good, and help the patient to an early recovery.

FUNCTIONAL NERVOUS DISEASES

NEURASTHENIA

The term "neurasthenia" denotes nervous exhaustion. It is the result of certain changes taking place within the body. These changes so act upon the nervous system that exhaustion is produced. The condition differs widely from hysteria, though sometimes symptoms co-exist. Neurasthenics are often sensible clever people who earnestly wish to be well. It is more common in women than in men, though it is seen in the latter as the result of worry and strain of business; there is also a type resulting from the strain of war conditions known as shell-shock.

Predisposing causes are: poisons entering the system, *e.g.* those produced by a disordered digestion, overstrain, shock, general ill-health, etc.

Dr. Edwin Ash says: "A great number of neurasthenic people owe their condition, in part at any rate, to chronic disorders of the digestive organs which, through insufficient digestion and absorption of food substances, lead to the production of toxins (that is, poisonous substances) in considerable quantities throughout the intestinal tract, from which they readily gain access to the circulation and thus reach the nervous centres. . . . Mental anxiety and nerve strain quickly upset the digestion, and the digestion being disordered, the absorption of poison quickly follows. . . . Neurasthenic patients suffer much from indigestion and colitis, in both of which conditions the mucous membrane of the various parts of the alimentary canal becomes coated with a thick catarrhal exudate, which prevents the proper action of the digestive juices, and further predisposes to the development of numerous microbes, which in turn contribute yet more poison to the disordered system."

Symptoms.—These are many and varied. Some or all of

the following may be present : a constant feeling of weariness, loss of appetite, dyspepsia, constipation, flatulence, mucous colitis, mental depression, insomnia, poor circulation, headache and giddiness, combined with a feeling of weight in the head ; restlessness and irritability.

Treatment.—This is varied, according to the condition and circumstances of the patient.

Much rest is essential, good food and fresh air are necessary.

A rest cure is often ordered. This will be further described in the chapter on Weir-Mitchell treatment. General massage is given, and should include much effleurage, muscle kneading, and passive movements. These are with a view to helping the circulation and general nutrition.

Definite symptoms must have special attention such as constipation, insomnia, or headache.

Dr. James Mennell, in a lecture upon Neurasthenia delivered to members of the Incorporated Society of Trained Masseuses in February 1915, gave the following helpful advice to those undertaking the treatment of neurasthenics by massage :—

“ To say that a neurasthenic enjoys being ill is untrue, unfair, and ignorant. No one who has helped in such a case would continue to accuse neurasthenics of seeking sympathy for imaginary ailments, but sympathy is what they deserve as sufferers from a disease one week of which makes death seem preferable. We may often admire them for their pluck and strength, but may never give the advice ‘ to pull themselves together,’ an attempt to do so may be the last straw that breaks them down. . . .

“ The masseuse must gain her patient’s confidence, by showing understanding of his sufferings, by listening patiently to his description of them, and above all by *never* forgetting. Masseuse-nurses are often told not to allow the patient to talk, but in neurasthenic cases he *must* talk, and we must talk to him, for we have to explain the symptoms and convince him that we know what it is like and that it is not unfathomable. We must give sympathy but not sentimentality.

“ The next step is to make some definite promise, no matter what, so long as we know we can carry it out. It is of no use to promise rapid improvement, especially when he has

suffered long, but we can hold out persistent hope, and, noticing every trace of improvement, play it for all it is worth, thus working by suggestion, always remembering the great variations which characterise his disease, the waves sweeping high, then low, as the cure proceeds, until they finally reach a level at the top."

Dr. Menell says that all massage in such cases should be governed by three laws, viz. :—

(a) "To perform only the most gentle movements, avoiding anything irritating (for the patient is well if he feels well) ;

(b) "To leave to the last any joint that is tender or hyper-sensitive.

(c) "To let all massage movement, whatever its actual nature, be slow, and above all, rhythmical.

"Massage is a medicine, and we may choose the dose, guided only by our own discretion, and by what our patients like, striving always to restore peace to wearied nerves, imparting by gentle, rhythmical movements the blessings of sleep and strength, of luxury, ease, and comfort."

HYSTERIA

Hysteria is a functional nervous disorder, presenting a variety of symptoms. It must be supposed that the higher centres of the brain lose their control.

Dr. Edwin Ash says: "that it is not that the patient *cannot* or that she *will not* ; but, that she *cannot will*. It has been the custom in times past to use the word 'hysteria' in referring to sham illnesses and malingerers, also in reference to young women who are over-emotional, and lacking in self-control. With such as these we are not now here concerned. Everyone to whom the task falls of dealing with hysteria must realise that it is a definite disease. The patient can no more help suffering from it than she could help having pneumonia or appendicitis."

Hysteria is a great imitator, and there is hardly any disease, from paralysis of various parts of the body to tuberculosis of the lungs, which cannot be simulated by patients suffering from this complaint. This being the case, diagnosis is often

extremely difficult. Mistakes are often made in both directions, *i.e.* a doctor may diagnose serious organic trouble, which eventually proves not to exist, or he may set down something as hysteria which turns out to be an organic disorder, involving endless suffering to the patient, and even sometimes costing life itself.

Hysterical patients are subject to convulsive attacks resembling epilepsy. They may be preceded by a sense of suffocation, pain in the stomach, headache and giddiness, and eventually with a cry the patient falls. In hysteria she invariably manages to fall gently without hurting herself, whereas in epilepsy the attack and fall are so sudden, there is often serious injury.

Those who have seen an hysterical attack cut short by such means as slapping in the face by a wet towel are apt to think that the patient objects so strongly that she at once controls herself. But the truth is that the sudden extra stimulus has given the mind and nervous system the impetus it requires to set it right again.

Some hysterical conditions can be proved by means of electricity, *e.g.* certain contractions and deformities. The electrical reactions remain normal when the condition is due to hysteria, whereas if due to paralysis they are altered.

Motor and sensory symptoms often appear, and the digestion is frequently upset.

"Globus hystericus" is a common symptom. The patient complains that a lump like an egg rises from the stomach to the throat. It causes a choking feeling and is often accompanied by an outburst of tears.

"Hysterical aphonia." The patient is unable to use the voice and speaks in a whisper. This is due to a perversion of the will, and the condition may exist for months or years.

"Anorexia nervosa" is a form of hysteria with severe digestive symptoms. The patient loses her appetite and it is only with the greatest difficulty she is persuaded to take food. She becomes emaciated and the skin is hard and dry. With wise and persistent treatment such cases may recover, but they are often unsatisfactory.

Treatment.—This must vary considerably according to the

signs and symptoms which manifest themselves, and also depend upon the general physical and mental condition of the patient.

A rest cure may be ordered, then massage would be given, and the moral control of the nurse and masseuse would be a very important factor. Symptoms, *e.g.* constipation, insomnia, and headache require special attention, and much may also be done for supposed symptoms, *e.g.* aphonia, which may be treated with vibrations over the larynx; paralysis, where massage and movements may be applied. Electricity is often given with success in such cases. Change of air and scene is often desirable, and improvement may be gained if the patient is away from her home and relatives.

NEUROSES

Under the name of "neuroses" are classed certain nervous disorders which occur without any known cause, and without any structural changes being detected in the nervous system.

THE NEUROSES OF OCCUPATION

Certain kinds of neuroses are acquired which appear due to the repeated performance of some particular function. The patient complains of inability to execute some act, the performance of which has probably taken him years to learn.

Writer's cramp is the commonest form of this group, and will here be dealt with fully, but similar conditions have been seen, *viz.* in piano players, who have been unable to strike chords correctly, violinists who have lost the power of holding their instrument and of fingering with the left hand, tailors who could no longer use the needle, composers who could not place their type, and latterly a similar condition has been seen in typists and telegraphists, who have been unable to carry on their work.

The actual changes which take place when any of the above conditions are present are unknown, but the trouble is said to be due to brain fatigue. It may, however, originate in the brain cortex, the conducting fibres, or the peripheral nerve or muscle, according to the symptoms shown.

WRITER'S CRAMP

Persons afflicted with writer's cramp are usually of a very nervous temperament.

The condition comes on gradually, and is hardly noticeable at first. The patient, not knowing what is before him, will continue his writing, compelling himself to go on, in spite of aching in the limb and increasing loss of power to write.

The trouble may progress so far that the patient is quite unable to write his name. It is generally observed that the disease progresses from the periphery towards the centre—that the muscles of the fingers are the first to fail, then those of the forearm, then those of the arm, and lastly in extreme cases the trunk.

The loss of writing power may be the only symptom. The following was the case of a patient who wrote to his doctor : "That fingers which could guide razor and needle, wield oar and musket, and though numb with cold knot and cast off reef points on a wet sail, should yet strike work when called on for the familiar character of their owner's name, seemed utterly beyond comprehension" (*Poore*).

The performance of other acts is, however, affected in some cases. To test this, the patient should be asked to wind his watch, to carry a full teaspoonful of liquid to his mouth, etc.

Symptoms.—Inability to perform the acts of writing. Minute movements of thumb and fingers for other actions may or may not be affected. Much fatigue in the hand and arm. There may be pain in the back and headache. Spasms in the muscles when writing is attempted. Often the flexors are spastic and contracted, while the extensors are weak and flaccid. Slight tremors are sometimes present. There is often tenderness of the nerve trunks, viz. the median, ulnar, and musculo-spiral nerves. There is a feeling of numbness and pins and needles. There may be mental distress, and in severe cases paralysis.

Treatment.—Rest is essential, and if this is taken completely in the early stages, a good result may be expected. For such writing as is absolutely necessary, the patient should be

advised to use a pencil, or a soft quill pen, and either should be grasped as lightly as possible. He should try to alter his writing somewhat, and let it be as large as possible.

Massage may be given with great advantage. The whole arm is treated from fingers to shoulder, so that the manipulations are carried over the region of the brachial plexus. At first give much effleurage, also gentle kneadings, vibrations, and passive movements. Caution is needed if the nerve trunks are tender, in fact massage should not begin until this symptom has subsided somewhat. If spasm and contraction are present in the flexor muscles, only effleurage must be applied to them, whereas stimulating movements may be given to flaccid and weak extensors, viz. stimulating effleurage, petrissage, frictions, and hacking. The treatment must continue for some weeks or even months. It must gradually increase in strength, and active and resistive movements should be eventually added.

After some weeks of rest, when there is improvement, the patient must train himself to perform small actions with the fingers and thumb.

Time for treatment, 20 to 40 minutes daily.

PARALYSIS AGITANS : SHAKING PALSY, OR PARKINSON'S DISEASE

Paralysis agitans is a progressive nervous disease of advanced life. Tremors of the limbs occur, there is rigidity of muscles, and a loss of equilibrium when walking.

Some causes are: violent emotion, excessive fatigue, exposure to cold and wet, injuries involving nerves; but in many cases no cause can be discovered. No distinctive lesion has yet been found for this disease, but probably centres in the brain cortex are affected.

The tremors first appear occasionally in the hand, thumb, or foot. The fingers move as though rolling a pencil or crumbling bread. The movements gradually increase in frequency and spread to all the limbs. Eventually, the head, neck, and trunk become involved. Later rigidity of the muscles appears, and this may be accompanied by cramp-like pains. There is a characteristic attitude of the body, and the joints

are held in a flexed position, hence contractions may occur. There is inability to maintain equilibrium when walking.

Other developments are: a sense of weariness in the affected muscles, and the patient eventually becomes irritable and fidgety. The speech is affected, and there is difficulty in swallowing. In rare cases the disease may be cured in the early stages, but as a rule it is incurable and lasts for many years.

Treatment.—If massage is ordered, give a general strengthening treatment. Much effleurage of the limbs, to reduce the rigidity. Petrissage of the muscles to improve their nutrition. If contractions of the flexors are present, petrissage is given only to the extensors. The treatment should be of a soothing nature, so tapotement must be given with discretion, and is often omitted.

Passive movements, carefully stretching the contractions.

Active movements. Urge the patient to control the tremors while performing the voluntary movements.

Walking exercises to improve balance and co-ordination.
Easy double-sided free exercises.

CHOREA OR ST. VITUS'S DANCE

Chorea is a functional nervous disorder, characterised by irregular, involuntary movements of almost every part of the body, which increase with excitement but cease during sleep. It is a disease of childhood. Girls are more often affected than boys, and it usually occurs between the ages of eight and twelve. The patient is usually of a nervous temperament, and the complaint often appears as the result of fright. Clever, highly strung girls who are pushed and overworked at school are also liable to attacks. It is more frequent among the children of the poor than among those in good circumstances. Want of proper food, neglect, constipation, and anæmia are predisposing causes. It may also follow measles and other diseases of childhood.

Chorea is closely associated with rheumatism, and in many cases heart symptoms appear. In women the condition sometimes accompanies pregnancy, but recovery as a rule takes place soon after delivery.

Symptoms of the Mild Form.—In the early stages there are slight twitchings in the face, and spasmodic jerky movements of the hands and arms. The condition at first is described as “fidgets.” When the child is conscious of being observed, the movements increase. There is slight loss of muscle power, the child drops things she takes in her hands. The diaphragm and muscles of the chest and abdomen are affected, causing irregular respiration. The heart's action may also be irregular. There is often a change of temperament—a good-tempered child becomes cross and irritable. There are emotional disturbances, such as night terrors and sleep walking. The mental capacity and the power of concentration are lessened. In some cases one arm or the face only is affected.

Symptoms of the Severe Form.—The movements become greatly exaggerated. Grimaces, contortions, and jerkings are continuous. Deglutition and speech are interfered with. The intellect is sometimes affected, and there may be paralysis.

Treatment.—In the severe form, complete rest in bed is essential. The patient must be kept very quiet, see no other children, or be excited in any way. Suitable diet and drugs are administered.

General massage may be given, and should be of a very soothing nature. It is often only possible to do effleurage with one hand, whilst the other supports and holds the affected limb. When the movements subside, a little gentle muscle kneading may be added. Soothing stroking down the spine is helpful.

In the milder forms, the general hygienic conditions of the patient are important. Lessons should cease for a time, and the patient lead an open-air life in the country.

General massage should be given daily, combined with local heart treatment, if heart symptoms have appeared. Easy free exercises should be done to help co-ordination, also methodical exercises in front of a looking-glass, *e.g.* :—

“Make the patient stand quite still without grimacing or jerking for half a minute. Simple free exercises. Later try finer movements, such as those entailed in drawing and writing. The patient can practise threading needles, starting with bodkin and thread” (*Lambert*).

CHAPTER XXI

Headache—Fatigue and sleep—Insomnia—Weir-Mitchell treatment—Relaxation—Suggestion.

HEADACHE

PAIN in the head arises from many causes, and may be slight or severe according to circumstances. It is usually a symptom at some stage of most acute diseases, it occurs also during many chronic ones.

The condition will here be considered under the following headings:—

1. Headache as a result of congestion of the blood-vessels of the brain. This occurs during heart disease, emotional excitement, menstrual irregularities, disorders of the liver, bowels, and skin, the after-effects of drunkenness, anæmia, bodily fatigue, etc.

2. Headache caused by rheumatism, neuralgia, and neuritis.

3. Megrin, migraine, or sick-headache. This form is periodical. It is induced by anæmia, general debility, and a nervous temperament. Some of the causes are: mental depression or excitement, bodily fatigue, anxiety, improper food, and breathing impure air. There are disturbances of vision and sensation, followed by intense pain, which may be limited to one side or part of the head. Cold hands and feet, nausea, and vomiting, and the pulse is feeble and slow. The attack generally lasts for a day, and occurs at intervals of weeks or months.

Treatment.—The cause of the headache must be discovered and removed as far as possible.

Massage may be ordered in cases of debility, anæmia, and disordered digestion, when a general strengthening treatment should be given, including much effleurage and muscle kneading, also abdominal treatment.

During the attacks of pain, local massage to the head and face may be beneficial. All manipulations should be of a slow and soothing nature.

If there is congestion of the vessels of the brain, effleurage down the front of the neck and throat, *i.e.* over the jugular veins, may give relief.

For headache of rheumatic origin, the neck and shoulders should be systematically treated (*i.e.* daily treatment for some weeks) with effleurage, kneading, friction, tapotement, and passive movements of the neck. It is essential to get rid of thickenings in the muscles which press on the nerves. Head massage is also beneficial, when frictions are the most important manipulation. They cause the absorption of rheumatic products in the scalp.

Headache of neuralgic origin requires soothing massage over the course of the affected nerves.

FATIGUE AND SLEEP

Fatigue is a state of diminished functional fitness, of body or mind or both. Muscular fatigue is the result of muscular activity. The activity causes certain materials to be produced, and poured into the blood (see p. 18). The nerve endings in the muscles are also greatly influenced by the fatigue-producing substances, and the whole of the nervous system is affected.

Everyone knows that sleep is nature's great restorer from fatigue, and that it is necessary for life.

"Sleep is the resting-time of consciousness, and as truly the resting-time of the central nervous system. Although the spinal cord does not become unconscious, for the excellent reason that it was never conscious, yet it would be a great mistake to suppose that it does not rest. It rests as completely as it can, compatibly with its maintaining some degree of tone in the muscles, and in the internal organs innervated by it" (*Harris*).

Harris considers that probably four conditions co-operate to bring about sleep, and four types may be described:—

1. The presence of fatigue products in the blood; *i.e.* a chemical type.

2. The absence of sensations, *i.e.* a sensory type.
3. The state of the circulation in the brain, *i.e.* a vascular type.

4. The absence of mental activity, *i.e.* a psychic type.

A proper amount of sleep is necessary to maintain the health of everyone. The amount varies according to age, and in the adult according to the health, temperament, and general environment of the individual.

An infant often sleeps for 20 hours out of the 24. A child up to the age of ten should sleep at least 12 hours out of the 24. From ten to fifteen years it should be 10 to 12 hours. From fifteen to twenty-five years 8 to 9 hours. After this age it should not be less than 7 hours. A nurse or masseuse often finds it necessary to inquire the amount of sleep a patient is taking. Such inquiries are specially necessary up to the age of twenty. Between the ages of fifteen and twenty, persons of both sexes are usually much occupied with study, work, etc. ; but it must be remembered that the body and mind are still growing and developing, and the question of necessary rest and sleep is a very important one. Regular habits should be established in youth, and though no hard-and-fast rule can here be laid down, early hours for both retiring and rising are the best.

INSOMNIA

Insomnia or sleeplessness may occur from a variety of causes, some of which are: painful conditions, excessive heat or cold, mental excitement or worry, indigestible food taken not long before bedtime, mental over-strain, bodily over-fatigue, nervous conditions (*e.g.* neurasthenia, gout, and various other acute and chronic diseases), drinking strong tea or coffee late at night, sleeping in new surroundings, etc.

People are known to suffer from complete insomnia, *i.e.* no sleep at all, night after night, when their condition is serious. Also from partial insomnia, when they may lie awake for hours, finally getting some sleep, or they may sleep the early part of the night, and then lie awake till morning. Such subjects often suffer from mental depression and gloomy forebodings.

Treatment.—The cause must be found, and removed as far as possible. When massage is ordered, it is often well to give a general strengthening treatment in the early part of the day. Breathing exercises, and others for circulation. Massage of the extremities and the abdomen is often useful. Attention should be paid to any special symptoms. The patient should be treated again at night, when in bed, and ready for sleep. The room is darkened and the patient kept warm. No talking is allowed. General massage is often given, all stimulating manipulations and passive and active movements being omitted. Much effleurage and kneading are used. Special attention is given to back massage as follows. The patient lying prone. Much effleurage. Large kneadings with one hand down each side. Soothing frictions, the fingers of both hands working together down each side of the spine. Vibrations, effleurage, and soothing strokings.

Time for back massage, 15 to 20 minutes.

The patient then turns over, the garments are rearranged as quietly as possible. Then soothing strokings are given over the head and face.

Time for stroking of head and face, 10 to 20 minutes.

WEIR-MITCHELL TREATMENT AND REST CURE

The Weir-Mitchell treatment is a method which was first systemised by Dr. Weir Mitchell of Philadelphia (about 1870), by which a weakened and debilitated person is restored to health by means of continuous rest, excessive feeding, and regular massage.

The cases suitable for this kind of treatment are those suffering from various forms of nerve prostration, *e.g.* neurasthenia, hysteria, anorexia nervosa, general debility after acute illnesses, etc.

The essential points to be considered in this form of treatment are: 1. Complete rest and isolation. 2. Excessive feeding. 3. Massage and sometimes electricity.

The course of treatment lasts from 6 to 10 weeks. The method must here be given in its strictest form, though in some cases it may be found unnecessary to fulfil all the rules to the letter.

1. Complete rest in bed and isolation.

It is usual for the patient to be placed in a nursing home. In any case it is essential that she should be removed from her usual surroundings, also from relatives and friends, whose influence is often injurious at such a time.

The patient is put to bed, and remains there for 3 to 5 weeks entirely, doing little or nothing for herself. During this time she should be lifted on to a sofa daily, while her bed is made, and should not put her feet to the ground at all, except once a week, when she must be weighed.

A nurse should be in attendance, and a masseuse come in twice daily to give massage.

During the early weeks of the treatment, the only people allowed to enter the patient's room are the doctor, matron, nurse, masseuse, and the maid who cleans the room.

The moral influence of the nurse and masseuse is of great importance, and upon this the recovery of the patient will greatly depend. Both should be kind, cheerful, and enthusiastic, but all orders must be firmly carried out, and loyalty to the doctor and his wishes strictly maintained. Newspapers, books, and letters are forbidden.

2. Excessive feeding.

This is a very important part of the treatment. For the first 2 or 3 days a milk diet should be given. About 5 ounces every 3 hours, and this must be increased to 10 ounces, so that at least 2 quarts are taken every 24 hours, and this amount must be maintained.

By degrees solid food is added, and at the end of a fortnight the patient should be taking three large meals a day, besides the milk, and strong soup and peptonised food at intervals. The diet should be varied, and the patient's choice considered, so long as the articles chosen are digestible and nutritious.

The largest meal of meat, etc., should be taken in the middle of the day. The evening meal should be a light one—fish, poultry, etc.; three or four eggs should be taken daily.

A specimen diet sheet and full daily programme are given later.

The nurse must record the times of meals and the amount taken. The patient should be drowsy between the meals.

The patient should be weighed once a week, and should increase about two stone in weight during the treatment.

3. Massage.

This is given to take the place of exercise, and so promote tissue waste, and to aid the processes of circulation, digestion, and assimilation.

At first 15 to 20 minutes' massage is given twice daily, but the time and strength of the treatment are gradually increased until full general massage with passive and active movements is given twice daily for $1\frac{1}{4}$ hours, making $2\frac{1}{2}$ hours in all.

Only effleurage should be given at first, but when full treatment is reached, much deep kneading of the muscles is very important.

SPECIMEN DAILY PROGRAMME AND SUGGESTION FOR DIET SHEET

- 7.30 a.m. Tea and bread-and-butter.
- 8.30 a.m. Breakfast: weak tea or cocoa, porridge, milk,
2 eggs, bread-and-butter, toast, fruit.
- 10.0 a.m. $\frac{1}{2}$ pint beef-tea and toast.
- 10.30 a.m. Massage.
- 11.45 a.m. $\frac{1}{2}$ pint invalid food.
- 1.15 p.m. Dinner: meat, 2 vegetables, light pudding,
stewed fruit, etc.
- 3.0 p.m. Cornflour, with milk and egg.
- 4.30 p.m. Tea or coffee, milk, egg, bread-and-butter, cake.
- 5.0 p.m. Massage.
- 6.15 p.m. $\frac{1}{2}$ pint beef-tea and toast.
- 7.30 p.m. Supper: fish, chicken, game, etc., pudding, fruit.
- 10.0 p.m. $\frac{1}{2}$ pint invalid food.

After 4 or 5 weeks, if improvement is going on, the patient may begin to sit up for a short time each day, and isolation need not be quite so strict. An occasional visitor is allowed, but nobody must come who would worry or upset the patient. They should not talk too much or stay too long. A little reading may now be allowed,

The massage is continued, and in some cases exercises are added, but the $1\frac{1}{4}$ hours' gymnastic treatment should not be exceeded.

A little later the patient goes out in a bath chair or for a drive. Towards the end of the course the excessive feeding and massage are gradually decreased, with returning health the patient is gradually able to give up invalid ways. A change to the sea is often advised, before returning to home and family.

RELAXATION

In the treatment of many diseases, specially those of nervous origin, rest is a factor of great importance. A method has been established in this country by Mrs. William Archer, by which the whole body may be placed in a condition of complete rest. The method is devised from the teaching of Miss Annie Payson Call, in her book *Power through Repose*.

The patient is taught gradually to relax all the muscles completely; the will power must be exercised to do this, and the process is combined with a series of breathing exercises. It is specially suited to those who are subjected to extreme nerve tension.

Relaxation exercises are done by a patient alone, or with the help of another person. A full description is given in *Power through Repose*, but the following gives some idea of the method:—

The patient lies flat. The masseuse lifts a limb and the patient allows its whole weight to lie in the masseuse's hands. When the latter leaves go, the limb should fall heavily on to the bed. If it remains in the same position, there is nerve tension to keep it there. Arms, legs, head, and trunk are lifted in series. It is sometimes necessary to relax muscles in this way before giving massage.

If the exercises are performed alone, the patient still lies flat, the eyes are closed, and the patient tries to give every part of her body to the force of gravity. One arm is lifted a few inches from the bed, and allowed to sink heavily back again. One leg is slowly drawn up, till flexed in hip and

knee, it should then sink down again by its own weight. The head may also be lifted in the same way, and for the trunk a slow rolling movement sideways is done, again allowing the body to return to the starting position by its own weight.

SUGGESTION

Throughout all ages it is possible to trace in history the healing of disease by some means dependent upon psychic power.

During the last few years there has been considerable revival of such methods undertaken scientifically by doctors specially in connection with nervous disorders.

So-called "Suggestion Treatment" is administered to certain patients, the aim being to "impress the mind with a new idea, or to strengthen a new impression that is too weak to be of any functional importance" (*Ash*). The great aim of the treatment is to implant within the patient's mind healthy ideas instead of morbid ones.

This treatment is undertaken by the medical man himself, or by some one who has made a special study of the subject.

Massage and electricity are useful adjuncts to suggestion, and much patience, care, and tact are required by the nurse or masseuse who is in charge of patients undergoing such treatment.

A further study of this subject is recommended to those who are brought into contact with it.

CHAPTER XXII

Massage during pregnancy—After confinement—Massage of the breasts—Exercises after confinement.

THE trained midwife is accustomed to performing certain manual manipulations for the help and comfort of her patient during the lying-in period, but the suggestions here given are meant more especially for the guidance of the non-midwife masseuse, who may be called upon to give massage either before or after confinement.

Pregnancy should be regarded as a normal physiological process. The development of the foetus within the uterus occupies 40 weeks or 9 calendar months. During this time the muscular walls of the uterus hypertrophy and new muscle fibres are formed. At the end of the 9 months the uterus extends to the costal margin and is 18 inches long. As the uterus increases in size, the skin and muscles of the abdominal walls necessarily become much stretched. When the foetus is fully formed labour sets in. This consists of vigorous contractions of the uterine muscle, which continue until the child is born.

MASSAGE DURING PREGNANCY

Massage is sometimes ordered during pregnancy, and is used in such cases when it is essential for the patient to rest. General massage may be given, omitting abdominal manipulations and movements in the hip-joints.

The following are some conditions when massage may be used during pregnancy:—

(a) If the patient is nervous, restless, or suffers from insomnia or neuralgia.

(b) For constipation and flatulence. Although abdominal

massage is usually contra-indicated, there are some cases when it may be given with great care up to the third month. It is safe till then, as the uterus has not risen into the abdomen. After this time, there would be fear of premature expulsion of the contents of the uterus, and a danger of the manipulations causing a displacement of the uterus.

(c) For varicose veins, or swelling of the feet and ankles.

During pregnancy the heart becomes hypertrophied and sometimes dilated. If symptoms of weakness appear, all the usual precautions for a heart patient must be taken.

In applying massage for any of the above conditions, the comfort of the patient must be studied in every way. The manipulations should be done slowly and gently, while tapotement should be avoided. In cases where there is great stretching of the abdominal skin, gentle stroking movements with a lubricant give relief. The breasts should not be touched at all. Heavy work over the lumbar region should be avoided, and some authorities maintain that no massage should be done over the course of the femoral vessels.

MASSAGE AFTER CONFINEMENT

After the child is born, the uterus gradually decreases in size and weight until it returns to its normal position within the pelvis. This gradual reduction is called "involution." The process continues for 8 weeks, when the uterus assumes its normal size and weight.

Involution may be helped by gentle manipulations with the finger-tips, over the abdominal walls. Such movements are usually done by the midwife in charge of the case, and may begin soon after delivery and be performed several times daily for the first few days, and after every night and morning so long as the patient complains of no pain.

Sub-involution is that condition when the uterus does not return to its normal size in the given time.

General massage is often ordered at the end of a fortnight. It is not usually allowed before on account of the possibility of a clot being present. "It aids digestion, natural action

of the bowels, improves the general condition, which is apt to suffer from muscular inaction; and by improving the tone and condition of the abdominal muscles, helps to restore these structures, which have necessarily suffered by stretching. . . . Permanent loss of power of the abdominal muscles is probably a predisposing cause of abdominal and pelvic displacement" (*Eden*).

The usual manipulations for the extremities may be given, plenty of movements down the spine to soothe the nerves and induce sleep. Careful kneadings of the abdomen to restore the stretched skin and muscles, also to relieve constipation, but any downward pressure in the abdominal region must be avoided. Neuralgia when present should be treated in the usual way.

MASSAGE OF THE BREASTS

Massage of the breasts is only undertaken under special circumstances, and is often done for the patient's relief by the midwife in charge of the case.

"It may be required for the increase of the flow of milk, in which case employ plenty of effleurage, and gentle friction. For congested breasts the fingers must be dipped in warm oil, and extremely gentle, light frictions from the circumference towards the nipple, followed by stroking towards the nipple, must be continued for $\frac{1}{4}$ hour on each breast. Great care must be taken to avoid chill, rubbing under cover, and applying a comfortable bandage at the finish.

"For emptying the breasts, long stroking combined with special diet, the use of evaporating lotions or belladonna, and firm bandaging will probably be ordered, but in all cases the utmost care and gentleness are imperative" (*Miss Robinson*).

THE USE OF EXERCISES AFTER CONFINEMENT

Some authorities advocate the use of exercises during the lying-in period. By Dr. Ballantyne's method, the patient begins exercises in the recumbent position, 10 minutes twice daily, and increasing to 30 minutes twice daily.

The following is a suitable scheme to begin with. The treatment may be gradually increased in time and strength, resisted movements being added in all the joints of the extremities, and later trunk movements :—

Position.—The patient lies in bed.

1. Deep breathing. 3 to 6 times.
2. Hands on shoulders, arm stretching up, out, forwards, and down. (This may be varied according to the patient's strength.) 6 to 8 times.
3. Free turning of the trunk to each side alternately, rolling over from one side to the other, swinging the arm over. 3 times.
4. Deep breathing. 3 to 6 times.
5. Alternate knee updrawing on to the abdomen (or this may be done both knees together). 3 to 6 times.
6. Repeat number 3.
7. Deep breathing. 3 to 6 times.

CHAPTER XXIII

THE AFTER TREATMENT OF WAR INJURIES BY MASSAGE AND MOVEMENTS:—Physico-therapeutics in military hospitals and convalescent camps—Nerve injuries—Stiff joints—Mechanical appliances—Apparatus to exercise wrist joints—Apparatus for flat foot—Apparatus to exercise a stiff ankle—Apparatus to exercise elbow joints—Apparatus for passively stretching the arm—Apparatus for abduction of the shoulder—Apparatus for improving reach of arm—Apparatus to overcome contracted hamstrings—Apparatus for strengthening the hand-grip—Massage treatment for shell-shock—Trench foot.

PHYSICO-THERAPEUTICS now hold a very important place in the treatment of those suffering from war injuries.

In all the large military and convalescent hospitals and in many of the smaller ones, departments have been established to carry out this important work, and many sufferers have been restored to health and strength by massage and other physical means who would otherwise have remained permanently disabled. In these special departments the class of patients treated varies considerably, and includes such conditions as nerve injuries, stiff joints, contracted scars, open discharging wounds, rheumatism, neuritis, sciatica, synovitis, trench feet, shell-shock, general debility, etc.

The patient often undergoes a series of treatment, which may include massage and movements, the use of various kinds of apparatus designed for the re-education of muscle groups, radiant heat baths of various kinds, and electricity.

It is not possible in this chapter to enter into the detail of all these treatments, but something must be said with regard to the application of massage and movements in these cases, and every masseuse undertaking military work should make herself practically acquainted with the use of the various kinds of apparatus in use, as well as studying medical electricity, which is alone a very important branch.

NERVE INJURIES

Nerves are often completely severed as the result of gunshot wounds. This condition may be present with an open septic wound, which must be healed before the nerve can be sutured.

During the time of healing it is important to maintain the nutrition and tone of the paralysed muscles by massage.

After nerves have been sutured, massage is often ordered, and usually may begin as soon as the stitches of the operation wound have been removed, though no manipulation may be given over the site of the operation wound for a considerable time.

All affected muscle groups need persistent massage and movements, the greatest care being taken never to overstretch the paralysed muscles. For this reason the limb is usually supported on a splint, which varies according to the parts affected.

During treatment by massage, support may be given by a pillow or sand-bag, *e.g.* in the treatment of wrist or foot drop.

Careful passive movements are given, still avoiding overstretching of affected groups, while the earliest sign of active movement must be noted and encouraged. See Nerve Injuries, pp. 201-207.

STIFF JOINTS

Stiff joints from a variety of causes come into the hands of every masseuse. Such conditions are spoken of in a general way on p. 117, but it is only by continual practice and perseverance that the most suitable movements can be applied to the best advantage.

It is well known that massage in these cases is almost invariably given in conjunction with movements both active and passive, but in the treatment of war injuries experience has shown that these usual methods have proved slow and often ineffectual in their results. Further assistance has been found necessary, and this has been achieved by various mechanical appliances.

The following are some of the problems which confront the masseuse when dealing with war injuries:

1. How to provide variety and interest to a treatment which may of necessity extend over a long period?

2. How to secure the co-operation of the patient and encourage him to use his own efforts? This is very important, and cannot be too strongly emphasised.

3. How to overcome the natural resistance which a patient exerts when a painful movement is performed?

In many cases the sooner the patient begins active movements the sooner will he get better.

The advantages of mechanical appliances are, they compel the patient to make active effort, and thus, of necessity, they overcome his resistance automatically. (It is impossible to perform an exercise and resist it at the same moment.)

They also give variety and interest to the treatment.

The disadvantages of mechanical appliances are that, unless the fundamental position of the patient, and the proper fixation of the affected part are sufficiently considered, the resulting exercise will in all probability be ineffectual. Patients are often told to "give themselves" their exercises, and the consequence is that the moment a strain is felt the patient stops or dodges the movement in some way. In consequence, apparatus work is often condemned as useless, notwithstanding the great advantages which can be obtained by its use in the direction of leverage, haulage, and fixation. This might be obviated by a little care and thought on the part of the masseuse, who will find that she possesses very real powers with even such simple devices as pulley and rope, and she will learn to look on them as very useful adjuncts to her usual methods.

Useful apparatus in a simple form has been devised by Mrs. Guthrie-Smith for the treatment of stiff joints and other injuries. By her kind permission illustrations and a short description of some of her apparatus are here given.

"A" (fig. 59) is a simple device, arranged to give flexion and extension of the wrists joints. The hands are slipped into a pair of stiff-fronted gloves; the gloves are attached to cords which are connected through the pulleys to a central

weight, which can be arranged to give more or less resistance as required. The patient must lean forward, with his fore-arms fixed to a sloping table, and must alternately flex and extend both wrist-joints. If only one wrist is injured, the operator must think out whether the flexion or extension is the most needed, and must arrange the gloves accordingly.

The idea of giving double-sided movements is, that it has been proved that better movement is thus obtained in the injured limb, and the attention of the patient is divided

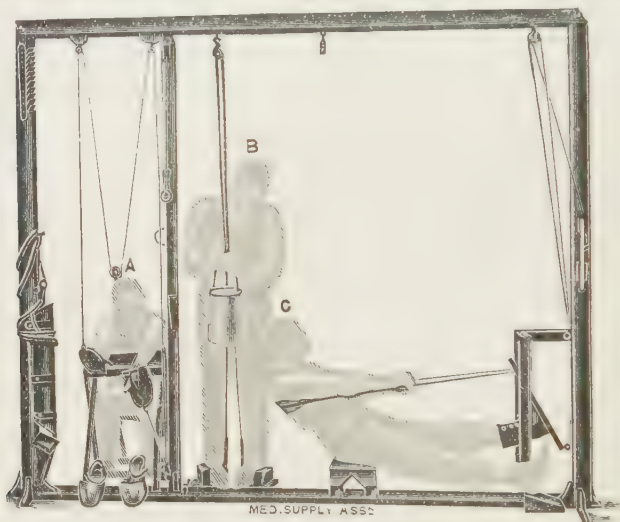


FIG. 59.

A. Apparatus for flexion and extension of wrist-joint. B. Apparatus for treatment of flat foot. C. Apparatus to exercise a stiff ankle.

between his two hands instead of being concentrated on the "pain and grief" of moving the injured one only. Thus involuntary resistance is lessened if not actually done away with.

B (fig. 59) is an apparatus for the treatment of flat foot. This device has been found specially helpful in educating the patient's foot muscles to "claw" backwards, and thus actively contract the transverse arch. At the same time the feet are strongly inverted and the weight thrown upon the outer border; also a strong passive push is obtained in an upward

direction on the longitudinal arch. This upward pull is obtained by the heavy sand-bag which is fastened to a rope and passes through an overhead pulley and down again to two leather straps on which the patient stands. These straps pass under the patient's feet, and are nailed to two blocks of wood, which are so placed on the foot-board that they keep the feet in an inverted position. The patient can pull on the rope to assist the pressure.

Ordinary tip-toeing can be given on this board also.

It is important to see that flat-footed patients carry out the typical exercises in a proper way. Children who are easily bored by the ordinary exercises are amused and interested when performing the same with pulley and rope.

C (fig. 59) is known as the "ankle strafe." It was constructed to overcome the difficulty of moving a really stiff ankle, such as one gets after Pott's Fracture, or of stretching very contracted calf muscles, such as is common after gunshot wounds.

The principle is that of the "long lever arm," and is so designed that it can be used by the patient himself, but the gymnast can assist in the stretching and secure "overstretching" of the muscles and joint, should the patient be lacking in energy or courage.

The patient sits on a stool and the foot of the injured side is fastened to a leather boot (which is cut away so as not to impede the ankle-joint movement), fixing the boot firmly to a flat board two feet long. To the top of this board a rope is fastened; the rope is continuous round the patient's back, and he also pulls on it with his arms, and so can bring his body weight to bear on the flexion of his own ankle-joint.

The board works on a pivot-joint, and in this way a very powerful leverage can be obtained, which will pull out the very stiffest contraction. The patient must not be permitted to bend his knee, and to prevent this a heavy sand-bag can be placed across the knee.

D (fig. 60) is an apparatus which gives double-sided action for the elbow-joints. It can be adjusted to give either ordinary muscle work for general strengthening treatment against the resistance of an adjustable weight, or it can be used to

specially obtain flexion or extension of either joint as required. The patient's trunk and upper arms are fixed by assuming a forward leaning position against a table which slopes away from him. The forearm should lie free over the edge of the table, and he grasps in his hands two handles which are attached to a rope, one end of which passes through the front "low-placed pulley," and by it his extended arm is pulled to the full limit of passive extension, while the backward pulley will pull the other arm to a full-flexed position. The rope is

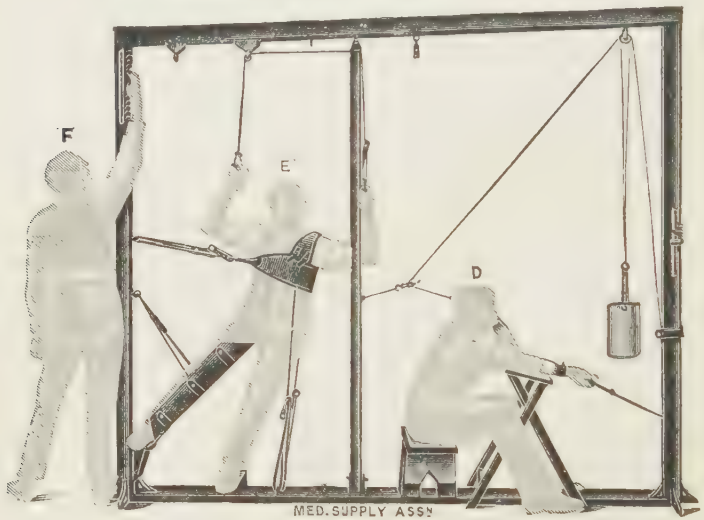


FIG. 60.

D. Apparatus to exercise elbow-joints. E. Apparatus to give passive stretching of arm and abduction of shoulder. F. Method of improving reach after shoulder injuries.

continuous between the two pulleys, and an adjustable weight is suspended between them and supplies the resistance. The exercise consists of alternate movement of the arms in opposite directions, and must be performed rhythmically and smoothly. The operator must see to the overstretching. The pulleys and handles are interchangeable to either arm, so flexion and extension of one joint can be specially thought out.

Ei (fig. 61) is a simple apparatus for injuries of the arm, such as fractures and dislocations; also for rheumatism, etc. It allows a good passive stretching upwards of the arm.

The patient grasps two handles, which are attached to an adjustable rope passing over two over-head pulleys. The sound arm pulls the injured arm up as far as possible. The elbow should be kept well back, and the shoulder abducted and rotated out. To secure this the operator is advised to stand behind the patient and to press the shoulder forwards, so that the crook of the arm is carried up on the same line as the post against which the arm and elbow are being pressed.

E² (fig. 60) is useful in chronic cases where there is great difficulty in performing abduction of the shoulder-joint without shrugging the shoulders, and so moving the whole shoulder girdle. A harness, consisting of a belt, passes over the clavicle, with a second one round the scapula.

The patient leans against the scapula belt with the whole weight of his body (as shown in the sketch), and so fixes his scapula and clavicle that abduction to 90° of the humero-scapula joint should be obtained without undue movement of the other bones. The position should be corrected by the operator, and if properly given is a powerful movement; only very light pressure from the operator is required, the patient doing the movement himself.

F (fig. 60) consists of a little series of notches being sawn in the side-post of the apparatus in order that the patient may climb up the notches with his hand, and so extend his reach. This is useful for any injury to the shoulder where the full reach has not been obtained.

Another apparatus (fig. 62), known as a "leg strafe," was

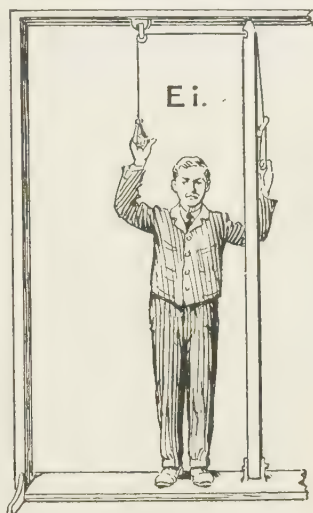


FIG. 61.

designed to overcome a very rigid case of contracted hamstrings.

The patient lies on a couch, with his trunk fixed by a belt.

A rope is fixed to a special shoe, and passes continuously from one leg to the other through a pulley which is fixed to the wall. The rope is then shortened, so that one leg is flexed at the hip-joint, the other remaining in full extension. A splint is attached to the injured leg to prevent overstretching and flexion of that knee. The patient then raises and lowers his legs alternately, and at the top of the movement the

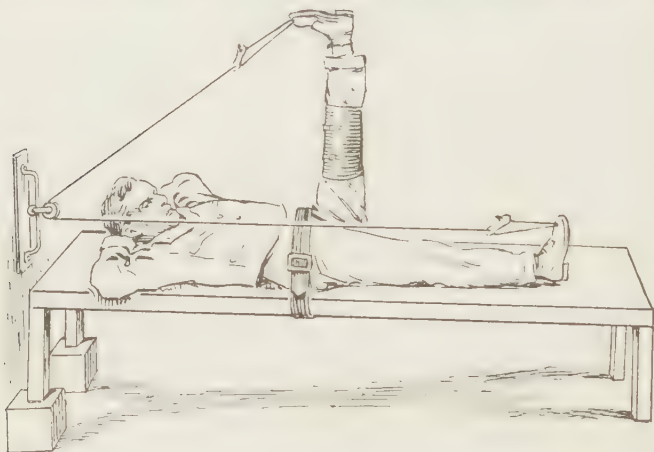


FIG. 62.

operator "overstretches" as much as is suitable and sees that the fundamental position is maintained. Thus, during the movement, the weight of the patient's own downwards falling leg gets all the weight and pulls up the other leg.

Very good results were obtained with the apparatus in the case of the patient with rigid hamstrings. He made no progress with ordinary passive stretchings, and he gave much resistance during his treatment, but with the apparatus a strong overstretching was obtained, the patient taking an active part in the proceeding. A maximum effort was obtained with the patient's co-operation, and the involuntary resistance was overcome.

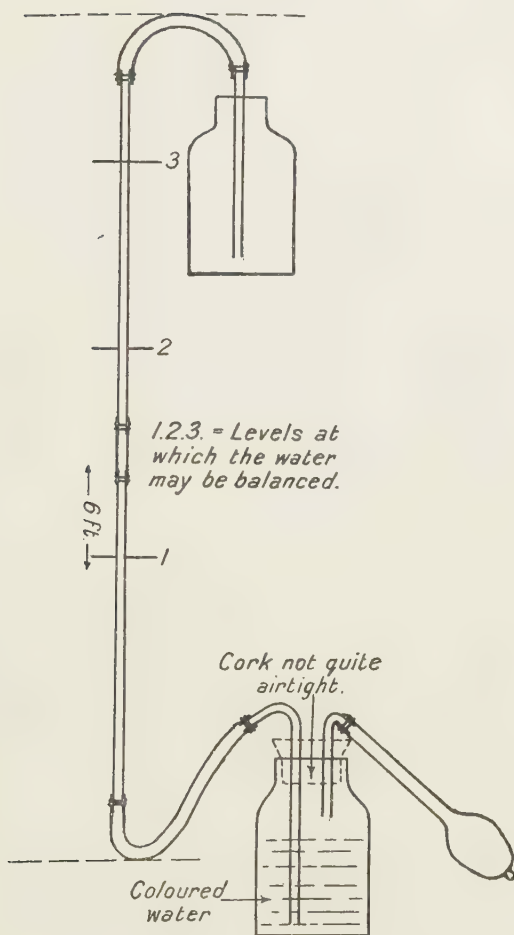


Fig. 62.—APPARATUS FOR STRENGTHENING THE HAND-GRIP.

This consists of two jam jars, a spray-pump bulb, some metal gas tubing, and two pieces of glass tubing connected by rubber. The lower jar contains coloured water, and is sealed in such a way as to be almost, but not quite, air-tight. The patient squeezes the rubber ball, which causes the coloured water to rise up in the glass tube. He is then told to try to balance the water columns at certain levels. This fixes his attention upon the one purpose, and so diverts his thoughts from his injured flexors. After a while he is able not only to balance the column of water at higher levels, but to pump it into the top jar, whence it flows back by syphon action to the lower one.

This apparatus was devised by Captain Kellett Smith, R.A.M.C., by whose kind permission it is here reproduced.

MASSAGE TREATMENT FOR SHELL SHOCK

The cases which come under the heading of "Shell-shock" are many and varied. They are often treated with general massage for a considerable time, and at a later stage by active exercises. Captain E. Bellis Clayton, R.A.M.C. (T.), gives some helpful instruction on the treatment of this condition by physical exercises, in an article published in the *Journal of the Incorporated Society of Trained Masseuses*, for February 1918. He states that in many cases the object of the treatment is to teach the patient to stand and walk.

Breathing exercises are given in bed, first alone, and then co-ordinating with a simple movement of a limb, such as flexion and extension of the elbow. The patient learns to breathe with his abdominal muscles and diaphragm. He is next placed in a sitting position, the breathing exercises are continued, and others for the limbs and trunk are added. A few days later the patient tries to walk with the help of an assistant on each side, and sometimes a third to move his feet. He next walks between parallel bars, supporting himself with his arms. He then uses crutches, then sticks, and finally walks alone. During this time general exercises are given, and the patient is taught to breathe slowly while doing them. When the patient can stand alone, harder co-ordination movements are added.

Captain Clayton emphasises the importance of the following points :

1. The masseuse must interest the patient in his treatment, and persuade him that he will be cured.

2. The masseuse must be continually pushing forward the treatment, and not wait at one stage till the patient thinks he is able to move to the next.

3. Massage should not be given regularly, but may be used when the patient first gets up if he complains of pain in his back and legs.

4. In many cases there is anæsthesia of the legs and feet, Strong faradism may be given for this, to restore the sensation. The masseuse should explain to the patient what effect the faradism will have; if she does not it will probably do no good.

The whole success of the treatment will depend upon whether the patient believes he is improving. These cases usually improve more quickly if they can be taken to a gymnasium for treatment; it makes more impression upon them than having exercises in the ward.

The following are two schemes of treatment suggested by Captain Clayton :

1. For a patient who cannot stand or walk without assistance—

- (1) Half lying abdominal breathing.
- (2) Half lying two arms flexion and extension.
- (3) Grasp sitting single knee flexion and extension.
- (4) Wing stoop stride sitting, back raising.
- (5) Practise standing and walking with belt or in parallel bars.
- (6) Grasp lying single knee updrawing and outstretching.
- (7) Half lying abdominal breathing.

2. For a patient who can walk to the gymnasium—

- (1) Half lying abdominal breathing.
- (2) Half lying two arms flexion and extension.
- (3) Wing high ride sitting, active trunk rolling.
- (4) Wing standing, alternate knee raising.
- (5) Standing arm parting, with head extension and deep breathing.
- (6) Wing stoop stride sitting, back raising.
- (7) Wing standing, heel raising, and knee bending.
- (8) Heave standing forwards, drawing.

These exercises must all be given slowly, and great care must be taken to see that the patient breathes properly. (5) is a special combined exercise for co-ordination; (4) and (7) are balance exercises.

TRENCH FOOT

The condition known as trench foot is probably produced by standing for long periods in wet and cold without exercise.

The legs and feet swell, the boots are stiff and hard, and so the cutaneous nerves are subjected to great pressure.

Captain Bellis Clayton says: "The main features of a trench foot are pain and swelling of the foot combined with a loss of sensation, chiefly in the toes. The whole foot is more or less blue in colour from the poor condition of the circulation. There may also be patches of superficial gangrene, and in a few cases complete gangrene of the toes or part of the foot. The chief complications which may occur later are flat foot and superficial ulcers over the toes. When cases arrive at the hospitals in England they can be divided roughly into three classes:

1. Those in which there is very little or no swelling, but in which there is considerable pain, which is usually worse at night.

2. Those in which swelling is the chief feature.

3. Those with superficial gangrene of the toes or foot.

In all these cases the pain is usually severe, and calls for early treatment. This pain is aching in character, and is frequently so bad at night that morphia may be required to give relief."

Treatment.—Rest with the feet raised. Electricity is employed, combined with massage, but the latter cannot be used until pain and tenderness have subsided somewhat; then effleurage, gentle kneading, and frictions to feet and lower legs are given. Passive and, later, active movements are added. As improvement continues the treatment may be increased to that given for flat foot, including free exercises.

Such conditions as scar tissue, rheumatism, neuritis, sciatica, and synovitis are dealt with in their respective chapters on these subjects. The masseuse may be called upon to treat cases of general debility, when a general strengthening treatment by massage and exercises is often of great value.

APPENDIX

EXAMINATION QUESTIONS

SPECIMEN QUESTIONS FROM RECENT EXAMINATION PAPERS (INCORPORATED SOCIETY OF TRAINED MASSEUSES)

1. Which movements will you chiefly employ for : (*a*) stretching contracted tendons ; (*b*) adherent scar tissue ? Give your reasons in each case.
2. What precautions are necessary in treating a compound comminuted fracture of radius (middle third) ?
3. What are the points to remember when applying a roller bandage ?
4. How would you proceed in a case of general nervous exhaustion, distinguishing between the treatment suitable for (*a*) the depressed, and (*b*) the excitable condition ?
5. Describe exactly what massage treatment you will give in a case of flatulent indigestion.
6. Define briefly the professional obligations of a masseuse.
7. Name the movements used in massage. Mention three cases in which any of the movements should be avoided.
8. What precautions are necessary in treating a case of (*a*) synovitis of the knee ; (*b*) recently healed wounds ?
9. Describe exactly how you will treat : (*a*) a case of sciatica ; (*b*) a case of wrist-drop.
10. What materials are used for bandages ? Which would you select for (*a*) a sprained ankle ; (*b*) securing a dressing in position ; and how would you apply them ?
11. How would you treat indigestion by massage ? To what organs would you pay chief attention ?
12. What are your aims in applying :—
 - (*a*) petrissage ;
 - (*b*) tapotement ?

13. What precautions would you take in treating (a) a case of recently displaced semilunar cartilage ; (b) a patient with hemiplegia one month after seizure ?

14. State how you would treat (a) a compound fracture of the lower third of shaft of humerus, beginning on the third day after injury ; (b) a case of congested liver.

15. How would you prepare and apply a hot fomentation ? What points require attention in renewing it ?

16. A bullet has severed the ulnar nerve at the elbow. State what results you think are likely to occur and what your treatment would be.

17. How would you apply massage to a patient suffering from chronic colitis ?

18. What manipulations would you employ in a case of (a) Fracture showing non-union after 8 or 10 weeks from date of injury, no massage having been previously applied ? Give an example. (b) Soft and flabby muscles ?

19. What precautions are necessary in replacing the splint, and in rebandaging a recent Pott's fracture ?

20. Outline your massage treatment of a child suffering from chorea.

21. If your patient faints during massage treatment, what means will you take to restore her ?

22. What is the effect of general massage on (a) The excretory organs ; (b) The respiratory system ?

23. What are the effects of the following manipulations (a) Strokings, (b) Vibrations, (c) Kneadings ? State the different ways in which they may be given.

24. What precautions would you take in giving treatment (a) For wrist-drop, (b) After an operation for appendicitis ?

25. Choose two cases for general massage, and differentiate between the treatments.

26. How do you take (a) Pulse, (b) Temperature, (c) Respiration ? What points require attention ?

27. Describe exactly how you will treat a case of fractured patella (transverse and wired).

28. Outline your treatment for a patient suffering from nervous breakdown.

GLOSSARY

Abrasion. An excoiation of the skin or mucous membrane.
Adolescence. Period between puberty and maturity.
Anorexia. Dislike to food.
Aphasia. Loss of speech.
Aphonia. Loss of voice.
Ankylosis. Union of bones forming a joint.
Arterio-sclerosis. A hardening of the walls of arteries.
Ascites. Dropsy of the abdomen.
Atony. A want of tone. Debility.
Axis-cylinder. The central core of a nerve-fibre.

Congenital. Existing from birth.

Clinic. Bedside instruction.

Clonic spasm. Spasms with alternate relaxations.

Colic. A term used to describe pain in the abdomen. It is generally due to violent and irregular contractions of unstripped muscular tissue. The pains are paroxysmal and of a sharp and cutting nature. They may have origin in the stomach, intestines, gall-bladder, bile-ducts, kidneys, and pancreas. Colic is therefore a symptom of many diseases.

Contra-indications. Anything forbidding a line of treatment.

Defæcation. Evacuation of the bowels.

Diagnosis. Recognition of disease from its symptoms.

Diaphysis. The shaft of a long bone.

Diathesis. A constitutional predisposition to disease.

Diuresis. An excessive secretion of urine.

Dyspnœa. Difficult or laboured breathing.

Emphysema. Distension of the tissues with air.

Empyema. Pus in the pleural cavity.

Epiphysis. A process of bone attached to another by cartilage.

Eructations. Belching.

Etiology. The science of the cause of disease.

Excoriation. A stripping or wearing of the skin.

Exudation. A morbid oozing out of fluids.

Hæmatemesis. Vomiting blood.

Hæmoptysis. Hæmorrhage from larynx, trachea, or lungs.

Hernia. The protrusion of an organ from its normal position.

Hyperemia. Excess of blood in a part.

Malingering. Feigning injury or illness.

Micturition. The act of expelling the contents of the bladder.

Osteo-myelitis. Inflammation of the medulla of bone.

Paresis. Slight paralysis.

Peri-metritis. Inflammation around the uterus.

Periphery. Circumference or outer surface.

Prognosis. Prediction of course and end of a disease.

Purulent. Having the character of pus.

Pyogenic. Developing or secreting pus.

Spastic. Pertaining to spasm, rigid.

Strangulated hernia. A portion of intestine so tightly constricted as to interfere with its return to position, and with the passage of fæces.

Tonic spasm. A continued rigid muscular contraction.

Traumatic. Pertaining to an injury.

BIBLIOGRAPHY

- A Treatise on Massage, its History, Mode of Application and Effects*, by Douglas Graham, M.D., of Boston, Mass. 1902.
- Lectures on Massage and Electricity in the Treatment of Disease*, by Thomas Stretch Dowse, M.D., F.R.C.P. 1906.
- Massage and Medical Gymnastics*, by Dr. Emil Kleen, translated by Mina Dobbie, M.B., B.Ch. 1918.
- Massage: its Principles and Practice*, by James Mennell, M.D. 1918.
- The Treatment of Fractures by Mobilisation and Massage*, by James Mennell, M.D., with an introduction by Dr. Lucas Championnière. 1911.
- Massage in Recent Fractures*, by Sir William Bennett, F.R.C.S. 1909.
- Nerve Injuries and their Treatment*, by Purves Stewart, M.D., F.R.C.P. 1916.
- Treatment of Joint and Muscle Injuries*, by W. Rowley Bristow, F.R.C.S.
- The Action of Muscles, including Muscle Rest and Muscle Re-education*, by William Colin Mackenzie, F.R.C.S. 1918.
- Shell-Shock and its Lessons*, by G. Elliot Smith, F.R.C.P., and T. H. Pear, B.Sc.
- General Nursing*, by Miss Eva Luckes, R.R.C. 1914.
- Surgical Nursing and the Principles of Surgery for Nurses*, by Russell Howard, F.R.C.S. 1905.
- Nerves and the Nervous*, by Edwin L. Ash, M.D., Lond.
- The Nursing of Nervous Patients*, by Edwin L. Ash, M.D., Lond. 1913.
- Nerves*, by David Fraser Harris, M.D., Lond. 1913. (Home University Library of Modern Knowledge.) 1913.

INDEX

- Abduction and adduction of
 - shoulder, 50
 - hip, 53
 - thumb, 47
- Absorption, influence of massage upon, 19
- Active movements, 43
- Adenoids, 170
- Aims of Incorporated Society of Trained Masseuses, 3
- Allchin, 169
- Alternate knee raising, 67
 - with leg extension, 68
- Anæmia, 19, 180
- Anatripsis, 2
- Andrewes, 182
- Anterior crural nerve, injury to, 205
- Anterior polio-myelitis, 22, 143, 196
- Aphonia, hysterical, 223
- Apparatus for arm injuries, 247
 - for elbow joints, 245
 - for flat foot, 244
 - for shoulder-joints, 247
 - for stiff ankle (ankle-strafe), 245
 - for strengthening the hand-grip, 249
 - for wrist-joints, 243
 - to improve reach of arm, 247
 - to stretch contracted hamstrings (leg-strafe), 248
- Appendicitis, 153
- Archer, Mrs. William, 235
- Arm bend standing, arm extension, 63
 - casting, 63
- Arterio-sclerosis, 175
- Ash, Dr. Edwin, 220, 222
- Axis cylinder, 187, 188
- Back raising, 74
- Balance walking, 69
- Ballantyne, 239
- Bastion, 194
- Beating, 14
- Bell's palsy, 213
- Bennett, Sir William, 90, 116
- Bismuth meal, 147
- Blood pressure, 172
- Bow legs, 137
- Brachial plexus, injury to, 200
- Breasts, massage of, 239
- Breathing exercises, 59
 - uses of, 57
 - how to teach, 57
- Bright's disease, 174
- Brodhurst, 123
- Bronchitis, chronic, 169
- Bruce, 158, 159, 160
- Burdon Sanderson, 78
- Bursæ, 113
- Bursa, enlargement of pre-patella, 114
- Bursitis, 113
- Call, Miss A. P., 235
- Callus, 89
- Cantlie and Boyd, 182
- Care of patient, 7
- Caries of spine, 83
- Catlin, George, 59
- Central Gymnastic Institute, 2
- Certificates for massage, 3, 6
- Cervical rib, 122
- Championnière, 90, 99
- Charcot's joint, 217
- Chest clapping, 76
 - expansion, 67
 - lifting, 60
 - lift stroking, 59
- Chinese system of massage, 1
- Chlorosis, 181
- Choice of training school, 5
- Chorea, 227
- Chronic transverse myelitis, 217

- Circular kneading of abdomen, 35
 Circulation, influence of massage upon, 19
 Circulatory system, diseases of, 172
 Circumduction of shoulder, 50
 hip, 53
 Circumflex nerve, injury to, 201
 Clapping, 10, 14
 Classification of movements, 10
 Clayton, 250, 252
 Club foot, 142
 Coccydynia, 211
 Colitis, 152
 chronic catarrhal or mucous, 152
 Colon frictions, 35
 kneading, 35
 stroking, 35
 Concentric muscle work, 44
 Confinement, massage after, 238
 exercises after, 239
 Congenital contraction of fingers, 134
 Constipation, 145
 Contra-indications to abdominal massage, 37
 massage in general, 41
 Conversation during massage, 7
 Coxa vara, 135
 Cramp, 21
 Crawling up wall, 94, 95
 Croft's splint, 92
 Crook sitting holding, 75
 Curvature of spine, 124

 Definition of massage, 10
 Deformities, 120
 of lower extremity, 135
 Diabetes insipidus, 164
 mellitus, 105
 Diaphragm, 50
 Diaphyses, 87
 Digna sequens, 3
 Dilatation of stomach, 150
 Diplegia, 194
 Dislocations, 105
 changes in, 106
 congenital, 109
 of hip, 109
 of elbow, 108
 hip, 109
 knee and ankle, 109
 shoulder, 106
 signs of, 105
 traumatic, 105

 Disseminated sclerosis, 194
 Double arm flexion and extension, 65
 rolling, 64
 Double plane arm carrying, 66
 Double-sided movements, 244, 245
 Dupuytren's contracture, 134
 Dyspepsia, 147

 Eccentric muscle work, 44
 Eden, 239
 Edgecombe, 147
 Effects and use of abdominal massage, 36
 active movements, 46
 effleurage, 10
 friction, 13
 lumbar side stroking and shaking, 37
 movements on intestines, 37
 liver, 37
 passive movements, 43
 petrissage, 13
 stomach-pit shaking, 36
 stomach shaking, 37
 tapotement, 14
 Effleurage, 10
 Elbow flexion and extension, 49
 Elimination, 13, 22
 Embolism, 182
 Enteritis, 151
 Epiphyses, 87
 Erb's paralysis, 200
 Etiquette, 6
 Eversion of foot, 51
 Exercises, medical gymnastic, 61
 for arms, 63
 for legs, 67
 for trunk, 71
 for feet, 81
 for the distal foot, 75
 in Scherer's treatment, 178
 order of giving, 62
 positions for, 62
 resisted, 61
 rules for giving, 61
 Expiration, 56
 External popliteal nerve, injury to, 206
 Exudation, 79

 Facial paralysis, 213
 Fatigue, 18, 230
 Fibrosis, 159
 Flat foot, 139

- Flexion and extension of ankle, 51
 elbow, 49
 fingers, 47
 head, 54
 head, sideways, 55
 hip, 53
 knee, 52
 shoulder, 50
 thumb, 47
 wrist, 48
- Foot, 138
- Fractures, definition of, 85
 angular, 86
 Colles's, 96
 complete, 86
 compound, 86
 depressed, 86
 double, 86
 fissured, 86
 greenstick, 86
 incomplete, 86
 lateral, 86
 longitudinal, 86
 massage for recent, 91
 objects of massage for, 91
- Fracture of anatomical neck of
 humerus, 93
 bones of foot, 104
 forearm, 98
 clavicle, 93
 neck of femur, 98
 olecranon process, 95
 patella, 100
 shaft of femur, 99
 humerus, 94
 surgical neck of humerus, 94
 tibia and fibula, 103
- Fractures, others near elbow, 96
 passive movements for, 91
- Fracture, Pott's, 102
 rotatory, 87
 signs of, 90
 simple, 86
 treatment by massage of, 90
 union of, 87
 ununited, 89
- Friedreich ataxia, 218
- Functional nervous diseases, 220
- Galen, 2
- Gastric ulcer, 150
- Gastritis, 148
- Gastroptosis, 154
- General corrective position, 76
 massage, 38
- Genu valgum, 136
 varum, 137
- Gillespie, 148, 149
- Glenard's disease, 153
- Globus, hystericus, 223
- Gooch's splint, 95
- Gout, 162
 acute attack, 163
 chronic, 164
- Gowers, 195, 216
- Graham, 17, 18, 19 20
- Granulation, 81
- Gray, 183
- Green-sickness, 181
- Gull, Sir William, 8
- Guthrie, 191, 192
- Guthrie-Smith, Mrs., 243
- Hacking, 14
- Hadrian, 1
- Hæmorrhoids, 155
- Hanging bar, 130
- Hanging position, 63
- Harold, 164
- Harris, 230
- Harvey, 2
- Headache, 40, 161, 229
- Head flexion, backwards, 55
 and forwards, 54
 sideways, 55
- Head rolling, 54
 rotation, 55
 suspension, 122
- Healing of wounds, 80
 by first intention, 81
 by second intention, 82
- Heart disease, 174
 changes and symptoms of, 175
- Heart, dilatation of, 175
 fatty infiltration of, 175
 muscle, degeneration of, 175
 nervous disease of, 175
- Heel raising and knee bending, 69
- Hemiplegia, 191
 infantile, 193
 massage for old standing, 192
 recovery of muscle groups in,
 192
 re-education of movement in,
 193
- Hertz, 147
- Hewing, 65
- Hindus, sacred book of, 1
- Hints to beginners, 5
 for learning massage, 24
 on giving movements, 46

- Hippocrates, 2
 Homer, 1
 Hospital etiquette, 6
 Housemaid's knee, 114
 Howard, 80, 86
 Hudson, 194, 195, 216
 Hyperemia, 78
 Hysteria, 222
- Ilio-tibial band, 115
 Incorporated Society of Trained Masseuses, 3
 Indigestion, 148
 Infantile paralysis, 143, 196
 Inflammation, 78
 chronic, 80
 of spinal cord, 217
 terminations of, 80
 Inhibitory nerves, 189
 Insomnia, 131
 Inspiration, ordinary, 56
 extraordinary, 56
 Intestines, massage of, 33, 34
 Inversion of foot, 51
 Ischæma, 118
- Kellett-Smith, 249
 Kidney, movable or floating, 154
 Kneading, 12
 circular, of intestines, 35
 transverse, of intestines, 34
 Knee flexion and extension, 52
 joint, 114
 pumping, 52
 Knock knees, 136
 Koch, 82
 Kong-Fu, 1
 Kyphosis, 130
- Lambert, 228
 Latham, 22
 Leith, 150
 Leg flexion, double, 69
 forward lying holding, 74
 lifting, 68
 swinging, 69
 Ling, Peter Henry, 2
 Liver, massage of, 33
 Local heart treatment, 41
 Locomotor ataxy, 216
 Lomi-lomi, 20
 Long sitting touch toes, 75
 Lordosis, 132
 exercises for, 133
 Lower motor neurones, 189
 Lubricants, uses of, 8
- Luke and Forbes, 177
 Lumbago, 159
 Lumbar side stroking, 36
 shaking, 36
 Lying position, 63
 Lymphatic flow, influence of
 massage upon, 19
- Mackenzie, 204
 Manipulations, 10
 Massage, definition of, 1
 by Chinese, 1
 by Greeks, 1
 by Romans, 1
 derivation of word, 1
 for injury to anterior crural
 nerve, 205
 circumflex nerve, 204
 external popliteal nerve, 206
 median nerve, 204
 musculo-spiral nerve, 205
 obturator nerve, 206
 ulnar nerve, 205
 general, 38
 history of, 1
 Massage of abdomen, 33
 arm, 24
 back, 30
 back of thigh, 28
 breasts, 239
 chest, 33
 elbow, 26
 face, 39
 fingers, 25
 foot and ankle, 29
 forearm, 25
 front of neck and throat, 32
 head, 40
 heart, 41
 hip-joint, 27
 intestines, 34, 35, 36
 knee-joint, 28
 liver, 33, 34
 lower leg, 29
 neck, 31
 shoulder, 26
 stomach, 33, 34
 thigh, 26
 thumb, 25
 wrist and hand, 25
 Massage, practical, 24
 Maynard Smith, 108
 Mechanical appliances for exer-
 cises, 243
 Median nerve, 201

- Medical conditions treated by
 massage, 146
 Megrim, 229
 Mennell, Dr. James, 221, 222
 Metabolism, 21
 influence of massage upon, 22
 Metatarsalgia, 211
 Migraine, 229
 Model, 25
 Motor and sensory tracts, 188
 Motto of Incorporated Society, 3
 Movements, active, 43
 for head and neck, 54
 in lying position, 55
 Movements in elbow, 49
 fingers, 47
 foot and ankle, 51
 hip, 53
 knee, 52
 lower extremity, 51
 shoulder, 50
 superior and inferior radio-
 ulnar joints, 48
 thumb, 47
 upper extremity, 47
 wrist, 48
 Movements, passive, 43
 practical hints on giving, 46
 Muller, 57
 Muscles, influence of massage
 upon, 17
 of respiration, ordinary, 56
 extraordinary, 56
 Muscle work, uses of various
 kinds of, 45
 Muscular torticollis, 120, 159
 Musculo-spiral nerve, 203
 Myelitis, chronic transverse, 217
 Myopathy, 161

 Nauheim treatment, 178
 Nervous system, 186
 influence of massage upon, 20
 Nerve degeneration, 187
 regeneration, 187
 suturing, 187
 trunks, affections of, 199
 Nerve injuries, 242
 Nerves of upper extremity, in-
 juries to, 199
 lower extremity, injuries to, 205
 Nerves, structure of, 186
 Neuralgia, 208
 intercostal, 212
 trigeminal, 212
 Neurasthenia, 220

 Neuritis, 208
 cervico-brachial, 209
 Neuroses, 224
 of occupation, 224

 Obesity, 167
 Obturator nerve, injury to, 206
 Oedema, 184
 Oliver, 147
 Operation, cases after, 154, 171

 Paralysis, 190
 agitans or Parkinson's Disease,
 226
 classification of types of, 190
 crutch, 201
 drunkard's, 201
 Erb's, 200
 post-diphtheritic, 214
 Paraplegia, 194
 Paré Ambroise, 2
 Patella reflex, 190
 Periosteum, 87, 89
 Peripheral resistance, 172
 Peristaltic action, 36, 71, 73, 76,
 146
 Personality, 5
 Pes cavus, 144
 Petrissage, 12
 Phlebitis, 181
 Phlegmasia alba dolens, 184
 Physiological effects of massage,
 17
 Pigeon breast, 167
 Piles, 155
 Pleurodynia, 159
 Polyuria, 164
 Poore, 121, 225
 Pounding, 10, 14
 Powder, use of, 8
 Pott's disease, 83
 Pott's fracture, 102
 Pot-bellied, 167
 Power through repose, 235
 Practical massage, 24
 Pregnancy, massage during, 237
 Progressive muscular atrophy, 195
 Pronation of forearm, 48
 Pulse, 173
 Pumping of knee, 52

 Radial and ulna flexion, 48
 Ranges of working muscles, 45
 Reaction of degeneration, 188
 Reflex action, 189
 Reflexes, deep, 189

- Relaxation, 235
 Resolution, 80
 Respiration, 56
 Respiratory diseases, 169
 forces, 56
 Rest cure, 232
 Rheumatism, acute, 157
 chronic, of joints, 157
 muscular, 158
 varieties of, 159
 of head, 160
 Rheumatoid arthritis, 160
 Rickets, 165
 Rickety rosary, 167
 Risien Russell, 163
 Robinson, Miss, 239
 Rolling of fingers, 47
 foot, 51
 head, 54
 hip, 53
 shoulder, 50
 thumb, 47
 wrist, 48
 Rose and Carless, 81, 86, 89, 100,
 112, 111, 112, 113, 115, 130
 Rotation of head, 55
 hip, 54
 shoulder, 51
 spine in scoliosis, 124, 126
 Rules of Incorporated Society, 3

 Sacral beating, 76
 Sagittal plane, 53
 Sandow's preparations, 178
 Sandwich Islands, King of, 20
 Sawing, 64
 Scar tissue, 81
 Schott's treatment, 177
 Scoliosis, 124
 causes of, 125
 rotation, 126
 cervical, 127
 dorsal, 126
 exercises, for 129
 how to examine for, 127
 lumbar, 126
 massage for, 129
 treatment for, 128
 varieties of, 124
 Secretory nerves, effects of mas-
 sage upon, 21
 Semi-lunar cartilages, displace-
 ment of, 115
 Sensory tracts, affections of, 216
 Separation of an epiphysis, 87

 Shaking, 10, 16, 34, 36
 Shaking palsy, 226
 Shaw, 154
 Shell shock, massage for, 250
 Shoulder blade exercise, 64
 Sitting, 62
 Skin, influence of massage upon,
 17
 Sleep, 230
 Spine, the normal, 123
 Spinal cord, inflammation of, 217
 Sprains, 110
 of muscles and their tendons,
 111
 Sprengel's shoulder, 133
 Standing, 62
 Static muscle work, 44
 Status of masseuse, 8
 Stiff joints, 117, 242
 Stiff neck, 121, 160
 Stockholm, 2
 Stomach, massage of, 33
 pit-shaking, 33, 34
 shaking, 33, 34
 Stretch, Dowse, 22
 Stroking, 10, 11
 of colon, 35
 St. Vitus's Dance, 227
 Suggestion, 236
 Supination of forearm, 48
 Suppuration, 80
 Swedish manipulations, 5
 Synovitis, acute, 111
 chronic, 113
 of elbow-joint, 112
 of knee-joint, 112
 of pre-patella bursa, 114
 teno, 113

 Tabes dorsalis, 216
 Talipes, different forms of, 142
 calcaneus, 143
 equinus, 143
 valgus, 144
 varus, 144
 Tapotement, 14
 Taylor, 190
 Temperament, 219
 the nervous, 219
 Thornton, 21, 56, 173, 188
 Thrombosis, 181
 Thumb flexion and extension, 47
 rolling, 47
 Tic douloureux, 212
 Timberg, 16

- Torticollis, acquired, 120
 congenital, 120
 spasmodic, 121
 Transverse abdominal shaking,
 36
 stroking, 34
 Trench foot, 251
 Trunk exercises, 71
 alternate side bending, 72
 turning, 73
 bending forwards and raising, 71
 downwards, 71
 raising and sinking, 74
 rolling, 71
 Tubby, 142
 Tubercular disease of spine, 83
 inflammation of bone, 82
 Ulnar nerve, injury to, 202
 Upper motor neurones, 189
 Varicose veins, 183
 Vaso-motor nerves, effects of
 massage upon, 21
 Vibrations, 15
 Visceroptosis, 153
 Volkmann's ischæmic paralysis
 and contracture, 118
 War injuries, treatment of, 241
 Weir-Mitchell treatment, 232
 Wiring of olecranon process, 96
 White leg, 185
 Wringing, 12
 Wrist rolling, 48
 flexion and extension, 48
 Writer's cramp, 225
 Wry neck, 120

HC 5N7M 0

22.S.178.

The theory and practice of mass1919

Countway Library

BDV1827



3 2044 045 522 935

22.S.178.

The theory and practice of mass

1919

Countway Library

BDV1827



3 2044 045 522 935